

FIFTY-THIRD ANNUAL REPORT  
OF THE  
DEPARTMENT OF MARINE  
AND FISHERIES

FOR THE  
FISCAL YEAR 1919-20

MARINE

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*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O., etc.,  
etc., Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the Fifty-third Annual Report of the Department of Marine and Fisheries, Marine Branch.

I have the honour to be,

Your Excellency's most obedient servant,

C. C. BALLANTYNE,  
*Minister of Marine and Fisheries.*

DEPARTMENT OF MARINE,  
OTTAWA, November, 1920.







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# REPORT

OF THE

## DEPUTY MINISTER OF MARINE AND FISHERIES.

To the Hon. C. C. BALLANTYNE,  
Minister of Marine and Fisheries.

SIR,—I have the honour to submit herewith my report for the fiscal year ended March 31, 1920.

It has been the aim of the department in its reports published during the war period to outline, first, the yearly losses due to enemy action and marine risk suffered by the chief maritime nations of the world, belligerent and neutral alike (Germany recognizing no neutrals in her submarine campaign), second, the extent to which these losses were repaired by the building of ships, and third the maritime standing of these nations during each war year, in comparison with one another, and also with their establishments prior to the war.

The outstanding feature of the shipping situation during the war, apart from the wholesale destruction of the world's merchant marine, has been the rapid rise of the United States among shipbuilding nations; whether she will continue to hold her present position, or not, remains to be seen.

The disabilities under which Britain laboured in the war up-keep of her merchant marine were given in detail in last year's report, these have now been largely removed, and she will be in a much stronger position to challenge competition; the output of the Dominions too, especially that of Canada will in the next decade be an appreciable asset in the sum total of the Empire's merchant marine.

### THE WORLD'S OVERSEAS STEAMSHIP TONNAGE POSITION.

	August, 1914.		November, 1918.	
	Total in Million Gross tons.	Per cent of World's Tonnage.	Total in Million Gross tons.	Per cent of World's Tonnage.
British Empire.....	18 $\frac{1}{3}$	46	15 $\frac{1}{4}$	43
United States (including Lakes).....	3 $\frac{1}{4}$	8	7 $\frac{1}{2}$	21
France.....	2 $\frac{1}{4}$	5	1 $\frac{1}{2}$	4
Japan.....	1	3	1 $\frac{2}{3}$	5
Italy.....	1 $\frac{1}{2}$	4	1	3
Russia.....	$\frac{1}{2}$	1	$\frac{1}{4}$	1
Greece.....	$\frac{1}{2}$	1	$\frac{1}{4}$	1
Neutral countries: Norway, Sweden, Denmark, Holland, Spain	7 $\frac{1}{4}$	18	5 $\frac{1}{2}$	15
Enemy countries: Germany, Austria-Hungary.....	5 $\frac{2}{3}$	14	2 $\frac{1}{3}$	7
Total.....	40 $\frac{1}{4}$	100	35 $\frac{1}{4}$	100



STATEMENT SHOWING OVERSEAS STEAMSHIP TONNAGE POSITION OF THE MAIN MARITIME COUNTRIES OF THE WORLD  
(EXCLUDING ENEMY COUNTRIES).  
(Gross tons).

1. PRE-WAR AND NOVEMBER, 1918.

	United Kingdom and Colonies.	United States, including Lakes.	France.	Japan.	Italy.	Russia.	Greece.	Norway.	Holland.	Sweden.	Spain.	Denmark.	Other Countries.	Total.
Tonnage position, August, 1914.	18,356,000	3,272,000	2,300,000	1,012,000	1,528,000	578,000	564,000	2,595,000	976,000	899,000	806,000	761,000	1,188,000	34,835,000
Net loss during war.	3,084,000		746,000		454,000	334,000	348,000	1,260,000	246,000	143,000	162,000	200,000		1,794,000
Net gain during war.		4,196,000		677,000									310,000	
Tonnage position, Nov., 1918.	15,272,000	7,468,000	1,554,000	1,689,000	1,074,000	244,000	216,000	1,335,000	730,000	756,000	644,000	561,000	1,498,000	33,041,000
Percentage of variation....	- 16.8	+ 128.2	- 32.4	+ 66.9	- 29.7	- 57.8	- 61.7	- 48.5	- 25.2	- 15.9	- 20.1	- 26.3	+ 24.6	- 5.2

2. ANALYSIS OF GAINS.

New construction, August, 1914, to November, 1918.....	4,765,000	3,643,000	155,000	970,000	209,000			213,000	556,000	110,000	35,000	132,000	61,000	10,849,000
Tonnage captured, etc.....	717,000	732,000	72,000	11,000	242,000								637,000	2,411,000
Gained by transfer and purchase.....	1,197,000	706,000	75,000	33,000	30,000	63,000	45,000	46,000	6,000	19,000	8,000	6,000	43,000	
Total gains.....	6,679,000	5,081,000	302,000	1,014,000	481,000	63,000	45,000	259,000	562,000	129,000	43,000	138,000	741,000	13,260,000

3. ANALYSIS OF LOSSES.

Enemy action.....	7,748,000	389,000	907,000	121,000	853,000	184,000	338,000	1,177,000	200,000	202,000	167,000	240,000	216,000	12,742,000
Interned in enemy ports.....	184,000		5,000			11,000							10,000	210,000
Marine risk.....	1,100,000	302,000	83,000	78,000	81,000	40,000	41,000	132,000	60,000	54,000	37,000	37,000	57,000	2,102,000
Transfers and sales.....	731,000	194,000	53,000	138,000	1,000	162,000	14,000	210,000	548,000	16,000	1,000	61,000	148,000	
Total losses.....	9,763,000	885,000	1,048,000	337,000	935,000	397,000	393,000	1,519,000	808,000	272,000	205,000	338,000	431,000	15,054,000



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Lord Pirrie, Controller-General of Merchant Shipbuilding in Britain, in the course of an article in "Modern Transport on "The Future of British Shipbuilding" from which these tables are taken, points out, that in the few years immediately preceding the war the British output of merchant shipping averaged 1,750,000 gross tons per annum, he puts the average yearly marine loss at 250,000 tons, making the progressive increase of the British Merchant Marine one and a half million tons per annum, of this a small proportion was disposed of yearly to foreign countries, therefore, although the net British loss amounts to only 3,000,000 tons, the gross loss for the nation's maritime requirements is about 8,000,000 tons.

This principle commonly termed the five per cent principle of course also applies to all the other nations suffering net losses; thus in the case of Norway as her pre-war tonnage was 2,600,000, in four years time this ought to have increased by 520,000 tons; as her net loss was 1,260,000 tons, her gross loss, or shortage to fulfil the proper requirements of her sea-carrying trade is 1,780,000 tons.

Norway's proportionate losses were appalling; through new construction and purchase during the war she obtained 260,000 tons, her losses by enemy action and marine risk were therefore 1,520,000 tons, out of a pre-war tonnage of 2,600,000, or very nearly sixty per cent.

In August, 1914, the world's total sea-going tonnage, exclusive of enemy countries, was 34,835,000, Great Britain contributing 18,356,000 tons, the United States including lake traffic 3,272,000, France 2,300,000, Italy 1,528,000, and Japan 1,012,000.

In November, 1918, the total gross tonnage was 33,041,000, a decrease of about five per cent, Britain's tonnage had decreased by 3,084,000, France's by 746,000, Italy's by 454,000, while United States' tonnage had increased by 4,196,000 and Japan's by 677,000. The strong position of the United States and of Japan is apparent.

Turning to new production for the years 1915 to 1918 inclusive, British output in 1915 in round numbers was 670,000 gross tons, United States 142,000; 1916, British 540,000, United States 240,000; 1917, British 1,200,000, United States 1,000,000; 1918, British 1,400,000, United States 2,260,000. It was not until 1917 that the United States commenced serious shipbuilding operations; in 1918 her output topped that of Britain by 860,000 tons.

Whereas before the war Germany was Great Britain's chief maritime competitor, now the United States is, a more satisfactory state of affairs, as whatever may be the rivalry it will probably be of a friendly nature and for the general benefit of mankind; it will be sometime before there is a likelihood of very keen competition in the world's sea-carrying trade, owing to the general shortage of tonnage; British shipping men accordingly view American shipbuilding activity with comparative calm.

When the era of competition does arrive, in order that Britain and America may best serve the general interests of world trade, it is essential that there should be complete understanding and co-operation between them, rather than any attempt to cut rates and obtain custom at the expense of each other.

The adoption of this attitude rests chiefly with the United States; Britain's heavy war losses of shipping and of trade alike, incurred in the allied cause, and America's immunity, and recent shipbuilding activity (entered into it is true largely on behalf of the Allies), place her in a position, should she so chose, to affect adversely the trade of the Empire to her own temporary advantage, though it is doubtful if undue competition would make for her permanent good.

America like Britain, though not in the same degree, has now need of an extensive merchant marine, and it is absurd to think that she would for a moment dream of scrapping her huge shipyards, built at great expense and under great



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difficulties: but the activities of both British and American yards will be needed for some years to come to restore the world's lost tonnage, and if they can eventually agree upon their building programmes so as not to increase unduly the total supply of tonnage, and upon their trade routes to insure a fair division of business and the profits accruing from it, it is likely to further the true interests of both, and certainly the interests of the world at large.

#### MERCANTILE SHIPBUILDING, 1919.

The returns here given are taken from the annual summary in Lloyd's Register, are in gross tons, and only include the outputs of the allied and neutral countries.

##### UNITED KINGDOM.

During 1919 there were launched from British yards 612 merchant ships of 1,620,442 tons (541 steamers of 1,584,920 tons, and 71 barges of 35,522 tons). These vessels included one wooden steamer and 53 vessels of reinforced concrete of which 41 were barges without propelling machinery, the remainder were steel vessels.

The output for 1919 exceeded that for 1918 by 272,322 tons, but was 311,711 tons less than the output for 1913, the first pre-war year.

Ninety-four per cent of the tonnage launched in 1919 was for home registration, the remaining six per cent for foreign owners; the latter comprising 29 steel steamers of 97,459 tons; France acquired 27,861 tons, Norway 20,054, and Greece 18,750.

The average tonnage of the ships launched excluding those of less than 500 tons was 4,006.

The outputs of the chief shipbuilding centres were: Glasgow 337,030 tons, Greenock 188,717, a total of 525,747 tons for the Clyde basin, an increase of 176,987 tons over the 1918 output; Sunderland 274,283 tons, Newcastle 239,836, total 514,119 for the Tyne district, a decrease of 26,758 tons from 1918; Belfast 213,720 tons, an increase over 1918 of 65,461 tons; Middlesborough 119,943 tons, West Hartlepool 82,233, a total of 202,176 tons for the Tees basin, a decrease of 18,180 tons as compared with the 1918 output.

At the opening of the year 1919, 1,979,952 tons of shipping were under construction in the United Kingdom, at the beginning of 1920 there were 2,994,249 tons, an increase of 1,014,000 tons of shipping in hand over the previous twelve months date.

##### UNITED STATES.

The American output for 1919 was 4,075,385 tons, an increase over that of 1918 of 1,042,000 tons; the steel tonnage exceeded that of 1918 by 1,431,000 tons, and the wood showed a decrease of 415,000 tons.

On the Atlantic coast 1,973,755 tons of steel ships were launched, an increase of 1,020,000 tons over the 1918 output. The tonnage launched on the Great Lakes totalled 495,559 tons, 64,000 tons more than in 1918; these were all sea-going steel ships.

The American steel tonnage included 137 steamers of between 5,000 and 6,000 tons, 251 between 6,000 and 10,000 tons, and five ships of over 10,000 tons each. Of the wooden ships 168 were over 2,000 tons, of these 103 were steamers, and the others sailing barges. Five steamers of reinforced concrete were built totalling 18,046 tons; two of these were of 5,000 tons burden.

The output of the United States for 1919 was 57 per cent of the world's output, and 74 per cent of the tonnage launched abroad.

At the beginning of 1920 the United States had 2,996,000 tons of shipping under construction.



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## JAPAN.

The output of Japan for 1919 was 611,883 tons, 121,959 tons in excess of the 1918 tonnage, and the highest on record for that country.

An idea of the strides made by Japan in the building of merchant ships may be gathered from the fact that her 1919 output nearly equals her output for the 22 years immediately preceding the war, 1892-1913.

Japan's 1919 tonnage included 48 ships of between 5,000 and 6,000 tons, and 22 of between 6,000 and 8,230 tons.

At the opening of 1920 Japan had 309,000 tons of shipping under construction.

## BRITISH DOMINIONS.

Canada launched during 1919, 271,264 tons of shipping, 13,000 tons more than in 1918. This included 28 steamers of 60,233 tons total, built on the Great Lakes. On the coast and on the St. Lawrence there were launched 12 steel steamers of between 5,000 and 6,000 tons each, and 80 wood steamers, 51 of which were between 1,000 and 1,200 tons, and 6 of between 2,000 and 2,700 tons.

The tonnage launched in all the other British Dominions reached 87,464 tons, a little less than one-third of the Canadian output. What is striking and almost astounding is that that remote corner of the Empire, the Hong-Kong district, was responsible for one-half of this tonnage, having built eight ships of between 5,000 and 5,806 tons burden.

The total tonnage launched in all the Dominions during the year amounted to 358,728 tons; this was 78,824 tons more than in 1918, and nearly equals the output for the 10 years 1908-17.

## SCANDINAVIAN COUNTRIES.

Denmark, Norway and Sweden launched 146,315 tons of shipping in 1919, the output being fairly evenly divided between these three countries, this was an increase of 32,859 tons over the 1918 production. One of these ships launched in Denmark was of 9,050 tons burden, and three others were over 4,000 tons each.

## HOLLAND.

The tonnage launched during 1919 reached 137,086 tons, 63,000 tons more than the 1918 total; this does not include vessels intended only for river navigation. Only three vessels of more than 5,000 tons were built, viz.,—two between 7,000 and 7,500 tons, and one of 9,700 tons built at Amsterdam.

Holland had in hand at the beginning of 1920, 328,000 tons of merchant shipping.

## ITALY.

This country built and put afloat ships totalling 82,713 tons in 1919, this includes for the first time the output of Trieste, 23,513 tons. Nine steamers were between 5,000 and 6,000 tons, and six between 6,000 and 8,500.

The Italian programme for 1920 amounts to 314,000 tons, nearly four times the 1919 production.

## SPAIN.

Spain's output for 1919 was 52,609 tons, about fifty per cent more than her 1918 total; the largest ship launched was of 5,700 tons burden.



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## SUMMARY.

	Tons.
United States.....	4,075,385
United Kingdom.....	1,620,442
Japan.....	611,883
Canada, 271,264 tons; other Dominions, 87,464.....	358,728
Scandinavian countries (Denmark, Norway, Sweden).....	146,315
Holland.....	137,086
Italy.....	82,713
Spain.....	52,609

The total output of allied and neutral shipping during 1919 amounted according to Lloyd's Register to 7,144,549 tons, an increase of 1,697,000 tons over the 1918 output, and of 3,811,000 tons over that of 1913, the pre-war record year.

Canada still retains her 1918 position, fourth on the list.

America shows an overwhelming superiority accounting as already stated for 57 per cent of the entire output of the allied and neutral nations; but if one turns to the shipping under construction at the beginning of 1920 it will be seen that America and Britain are almost exactly on a par, each having about 3,000,000 tons of merchant shipping in hand. America apparently is not prepared to maintain her terrific pace of building set in 1919, her programme for 1920 falling short by about 1,000,000 tons of her 1919 production; Great Britain, however, has increased her building programme for 1920 by about the same amount; it would seem that she may yet retain her ancient shipbuilding supremacy; time will show; but that America will always prove a most formidable competitor is beyond question.

Japan, too, evidently intends to ease her rate of building, having at the beginning of 1920, 309,000 tons of shipping under construction, as compared with an output of 611,883 tons for 1919.

Holland and Italy on the other hand are speeding up very markedly, the former having for 1920, 328,000 tons of shipping in hand, and the latter 314,000 tons, as compared with 1919 productions of 137,086 tons and 82,713 tons respectively.

There is another point to be considered in the comparison between American and British merchant tonnage output during 1919.

A shipbuilding number of the *Glasgow Herald* bearing date December 30, 1919, in giving the tonnage figures for the two countries (they are slightly higher in each case than those given by Lloyds) puts the indicated horse-power of the American tonnage at 2,591,210, of the British at 3,209,040; the American tonnage for 1919 though more than double the British in quantity is far from being double in effectiveness; the American ships are obviously much slower on an average than the British; and speed in the sea-carrying trades means much.

The *Glasgow Herald* thus sums up the situation: "The American tonnage for 1919 is more than double the British, but it is not necessarily twice as effective. In all probability it is very little more effective, because it includes many lake vessels and a large number of wooden ships of little sea-going value, while many of the fabricated steamers are less efficient on service than British-built vessels of similar sizes, and cost much more for maintenance.

The fact remains, however, that the capacity for doing an enormous amount of work has been proved, and only further training and the improvement and development of designs and methods of work are required to bring the general standard of quality up to the British level. After that there has to be considered (1) the demands of American shipping and (2) the question of comparative costs. If American shipping can be established on a world-wide basis it will support a very substantial home shipbuilding industry, while if the American costs can be made as low as those of the United Kingdom there will be competition for contracts on this side of the Atlantic.



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## ATLANTIC EMIGRANT TRAFFIC.

In the report of a British Board of Trade Committee on the position of shipping, and shipbuilding industries after the war, a part is devoted to the emigrant traffic from Europe before the war, and the methods by which German lines acquired a paramount share of it; it is very doubtful if these methods are generally known, and they are of great interest, as they show conclusively the German attitude in the conduct of their shipping trade.

In 1894 control stations were first established by Germany along the Russo-German frontier, after an outbreak of cholera in Russia, in order to prevent the spread of the disease by Russian emigrants, so far so good; Germany soon realized, however, that these control stations might be used to divert the stream of European emigration to her own lines, in the same year accordingly an order was passed placing the management of the control stations in the hands of the Hamburg-America, and North German Lloyd Companies, and not long afterwards the system was extended to cover the Southern as well as the Eastern frontier.

The German regulations provided (1), that the emigrants should be in good health, (2) that they should be furnished with a proper contract ticket for some steamship line, as well as with a railway ticket to the port of embarkation, and (3) that they should possess 400 marks; if the emigrant were travelling by a German line this last requirement was not enforced, if by a British one, failing to meet it, he was not allowed to pass beyond the control stations; this was not all, should the emigrant possessing a ticket for a British line, be in a position to comply with all the three requirements, he was subjected to all manner of delays and inconveniences, and an attempt was made to either bully or cajole him into shipping by a German line, if he still remained obdurate he was sent back to his place of departure.

Representations were made to the British Government by the Cunard, White Star, and other British lines pointing out the abuse of their control system by the Germans, and they were called upon for an explanation, but merely made evasive replies, and the system continued in full force with the results shown in the table below:—

STATEMENT showing the number of Third-class Continental Passengers carried by the United Kingdom and Continental Services of various Steamship Lines during 1913.

	Number.	Per cent.
(a) From United Kingdom ports by transshipment or by subsequent call at a French port—		
British lines.....	78,000	9
American lines.....	23,000	3
Total.....	101,000	12
(b) From continental ports by direct services—		
British lines.....	91,000	11
Enemy lines.....	417,000	50
Other lines.....	220,000	27
Total.....	728,000	88
Total (all lines).....	829,000	100

It will be seen that 12 per cent of the Atlantic emigrant traffic was from United Kingdom ports, the remaining 88 per cent from continental ports; of the latter only 11 per cent was carried by British lines and 50 per cent by German; two lines alone the Hamburg-America and the North German Lloyd accounted for 40 per cent of it.



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The principal German steamship lines operating just before the war, and all members of one group were:—

Line.	Gross tons, June 30, 1914.	Route.
1. Hamburg-America.....	1,093,000	All parts of the world except Australia and the East Indies.
2. North German Lloyd.....	716,000	All parts of the world except East and West Africa and West coast of America.
3. Hamburg-South America.....	268,000	South and Central America, and New York to South America.
4. Hansa.....	339,000	India, Red Sea ports, and South America.
5. German Australia.....	264,000	Australia and East Indies.
6. Kosmos.....	179,000	West coast of America.
7. Roland.....	75,000	West coast of America.
8. German East Africa.....	105,000	East Africa.
9. Woermann.....	112,000	West Africa.
10. Hamburg-Bremen-Africa.....	43,000	West Africa.
Total.....	3,194,000	

These lines held 60 per cent of Germany's shipping, the most important line outside this group was the German Levant Line (155,000 gross tons).

The report thus sums up the effects of the German system of Control Stations:—

- (1) The most important part of the eastern emigration movement to America passed across Germany and Austria-Hungary.
- (2) This movement was tapped by the German lines at control stations erected at the chief frontier posts.
- (3) Most of the emigrants were forced to travel by the German lines on pain of being refused transit.
- (4) This control over the emigrant traffic was used by the German lines as a weapon for dividing their competitors and forcing unfavourable agreements on them.
- (5) The action of the German lines had the support of the German Government.

The salient features of the German mercantile marine before the war were:—

- (1) The German mercantile marine was essentially a "liner" fleet in which the passenger element was all important.
- (2) The bulk of German shipping was owned by a few powerful companies, more or less closely associated and working in close agreement.
- (3) The main strength of German shipping despite its world-wide activities was concentrated in the Atlantic trades; and the principal services of the two most powerful German companies—the Hamburg-America line and the North German Lloyd—were to the United States.

The Atlantic emigrant traffic before the war was the most profitable of all the sea trades, and the earnings of the German lines employed in it enabled them to adopt a policy of systematic rate cutting in the cargo services on other routes, aided it is true by a system of Government subsidies; the subsidies paid annually by the German Government to German steamship lines before the war were:—

To the North German Lloyd, £33,450 for services to China, the East Indies and Australia.

To the Hamburg-America Line, £10,000 for a service to Heligoland, Borkum, etc.

To the German East Africa Line, £67,500 for the service to East Africa.

The findings of this report show clearly the ruthless but effective methods by which Germany became the second of the maritime powers, under a very great handicap, as she was the last in the field; her system of control stations which served her in such good stead is now a thing of the past, as it is to be hoped is also Germany as a first-rate maritime power; but the Atlantic emigrant traffic



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although quiet enough now, may in time be resumed, and like a stream dammed and then released, flow in a still stronger current to our shores; Germany's 50 per cent of it will have gone a begging, and should this trade revive, it will be very much in the interests of the Empire's merchant marine to secure as large a share of it as possible.

## MERCHANT MARINE UP-KEEP COST.

The profits of a merchant marine are of course partly dependent upon the cost of its maintenance.

The following is an approximate comparison of the cost of wages and board per month between a British, an American, a Canadian, and a Japanese steam merchant ship of similar tonnage and dimensions; cost of the British ship for wages and board per month \$3,645.09, of the American \$6,711.10, of the Canadian \$2,303.50, and of the Japanese \$1,124.50.

The pay of the master of the Canadian ship was \$250 per month, that of the master of the Japanese ship \$100 per month; able seamen on the Canadian ship received \$16.20 per month, on the Japanese ship \$9 per month.

Taking the American cost of operating which is by far the highest as representing 100 per cent, the British is 54 per cent, the Canadian 34 per cent, and the Japanese 17 per cent; it is apparent that the American merchant marine is operated under a great disadvantage as compared with the Japanese, and to a lesser extent with the British and the Canadian; the Canadian operating costs are 20 per cent less than the British, 66 per cent less than the American, but nearly double those of the Japanese.

It is altogether likely when the period of competition sets in that America will lower her cost of operation, otherwise she will be heavily handicapped.

## AMERICA'S MERCHANT MARINE.

On July 1, 1919 (the end of the American fiscal year), there was, excluding vessels of under 500 tons, a fleet of 2,506 sea-going ships, aggregating 8,106,956 gross tons, under the American flag, made up as follows:—

359 freight and passenger steamers, totalling.....	1,344,505 gross tons.
29 freight, passenger and refrigerator, totalling.....	150,198 "
1,488 freight, totalling.....	4,960,800 "
27 freight and refrigerator, totalling.....	152,513 "
188 steam tankers, totalling.....	1,013,051 "
415 sailing ships, totalling.....	485,889 "
2,506	8,106,956 "

This tonnage included 118 ships of 315,086 gross tons under the American flag but foreign controlled, leaving 2,388 ships of 7,791,870 gross tons under both American control and flag. There were also under American control 384 foreign vessels of 1,262,669 gross tons.

## GROWTH OF AMERICAN SHIPPING.

The ensuing table prepared by the United States Commissioner of Navigation shows the growth of America's Merchant Marine from the years 1914 to 1919, inclusive:—

July 1.	Foreign Trade.	Coasting Trade.		Total.
		Great Lakes.	Sea and River.	
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
1914.....	1,076,152	2,882,992	3,969,614	7,928,688
1915.....	1,871,543	2,818,000	3,699,886	8,339,429
1916.....	2,191,715	2,760,815	3,517,119	8,469,649
1917.....	2,446,399	2,769,824	3,654,814	8,871,037
1918.....	3,603,706	2,708,523	3,612,289	9,924,518
1919.....	6,669,726	2,635,680	3,601,894	12,907,300



A glance at this table will show that American coastwise shipping, both Great Lakes, and Sea and River, between the years 1914 and 1919 has remained nearly stationary; comparing 1919 with 1914 there has been a decrease of 247,312 tons in the Great Lakes shipping, and of 367,720 tons in the sea and river shipping; but the overseas shipping in 1919 was slightly more than six times that in 1914.

Lloyds states that in 1914, 41·6 per cent of the world's sea-going tonnage was owned in the United Kingdom, 4·46 per cent in the United States; in 1919 the United Kingdom owned 34·1 per cent, the United States 20·4 per cent.

On October 1, 1919, the total sea-going American merchant tonnage of 500 tons and over, comprised, according to the American Bureau of Navigation, 2,991 vessels of 9,352,945 gross tons as follows:—

	Vessels.	Gross tons.
Vessels 1,000 gross tons and over—		
Steam and gas .....	1,988	7,928,260
Sailing .....	346	558,835
Vessels 500 gross tons and over—		
Steam and gas .....	155	113,376
Sailing.....	442	340,950
Total.....	2,931	8,941,421
Additional vessels of 500 gross tons and over adapted for merchant service transferred to the Navy or the War Department since April 6, 1917.....	60	411,524
Grand total.....	2,991	9,352,945

America's sea-carrying trade has naturally kept pace with the growth of her merchant marine.

In 1914, of the United States imports and exports, 9·7 per cent were carried in American bottoms; in 1919, 27·8 per cent.

There can be no doubt that America's export trade was for many years hampered by her lack of an adequate merchant marine; the returns for the years 1914 to 1919 show this clearly.

Fiscal Years ending June 30.	United States Exports.					Total.
	Europe.	North America.	South America.	Asia and Oceania.	Africa.	
1914.....	\$1,486,498,729	\$ 528,644,962	\$ 124,529,909	\$ 196,994,033	\$ 27,901,515	\$2,364,579,148
1915.....	1,971,434,687	477,075,727	99,323,957	192,235,218	28,519,751	2,768,589,340
1916.....	2,999,305,097	733,024,674	180,175,374	377,386,709	43,591,031	4,333,482,885
1917.....	4,324,512,661	1,163,758,100	259,480,371	489,564,198	52,733,064	6,290,048,394
1918.....	3,732,174,352	1,236,359,013	314,558,794	582,320,455	54,298,757	5,919,711,371
1919.....	4,634,816,841	1,291,932,342	400,901,601	812,276,041	85,157,432	7,225,084,257

The exports for 1919 were treble those for 1914, and nearly two-thirds of them went to Europe.



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## AUSTRALIAN MERCHANT MARINE..

The department is indebted to Mr. A. M. Bomphrey, Director of Australian Shipbuilding, and to Mr. G. H. Knibbs, Commonwealth Statistician, for the statements of Australia's merchant marine and shipbuilding programme here given:—

## VESSELS ON THE AUSTRALIAN REGISTER, JANUARY, 1919.

	Number.	Net Tons.
Steam Vessels—		
Dredges and Tugs.....	130	9,157
Other Steam Vessels.....	978	314,048
Total Steam Vessels .....	1,108	323,205
Sailing Vessels—		
Fitted with auxiliary power.....	1,066	42,121
other.....	214	4,828
Total Sailing Vessels.....	1,280	46,949
Barges, Hulks, Dredges, etc. not self-propelled.....	251	62,264
Total Vessels on the Register.....	2,639	
Total Net Tonnage.....		432,418

## AUSTRALIAN SHIPBUILDING PROGRAMME.

The Australian programme provides for the construction of 24 steel cargo steamers as follows:—

## STEEL VESSELS.

Locality.	No.	Builders.	Type.
Williamstown.....	6	Commonwealth Ship Construction Branch	Steel Cargo Steamers.
Walsh Island.....	6	New South Wales Govt.....	“ “
Cockatoo Island.....	2	Commonwealth Navy Dept.....	“ “
Maryborough (Q).....	4	Walkers Limited.....	“ “
Adelaide.....	4	Poole and Steel.....	“ “
Tasmania.....	2	Mersey Shipbuilding Company, Ltd.....	“ “

The building programme for these 24 steel cargo steamers is divided into three parts: The first part comprises 6 ships of 5,500 tons deadweight each, and a sea speed of 10½ knots. These have all been built and launched, two at Williamstown, two at Walsh Island, and two at Cockatoo Island.

The second part includes 14 ships being built in the following yards: 2 at Commonwealth Dockyard, Williamstown; 3 at Government Dockyard, Walsh Island; 1 at Commonwealth Dockyard, Cockatoo Island; 4 at Walkers Limited, Maryborough, Queensland, and 4 at Poole and Steel's Adelaide, South Australia.

These vessels will be of 6,000 tons deadweight capacity with a sea speed of 11 knots. Six of these ships will be completed in eighteen months, six in two years, and the remaining two in two and a half years. All are being built on the Isherwood system of longitudinal framing.

The third consists of four large freighters, 520 feet in length, three-decked, of 12,800 tons burden, with a trial speed of 15 knots, and a sea speed fully loaded of 13 knots. These ships are being built at the Cockatoo Island and Walsh Island yards, and will be in commission in two and a half years time.



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In addition to this Australian programme a contract has been entered into with the English Vickers for the delivery of three 12,000 ton steel freighters, length 520 feet, sea speed 13 knots, for delivery in January, June, and October, 1921, respectively; and with Beardmores for two exactly similar freighters, of the same speed, for delivery sometime during 1921.

Fourteen small wooden steamers as well have been built for the Australian Government in American yards.

In the space of two and a half years Australia will have in commission six ships of 5,500 tons each (these are already afloat); fourteen of 6,000 tons; five of 12,000 tons; and four of 12,800 tons; or a total additional sea-going tonnage of 228,200. Her sea-going tonnage will in this time have nearly doubled. But this is not all. Of this new tonnage not a ship will be under 5,500 tons burden, and a sea speed of  $10\frac{1}{2}$  knots; and 111,200 tons of it, or very nearly one-half, will be made up of ships of 12,000 tons burden with a sea speed of 13 knots.

It is quite within the bounds of probability that the new tonnage will be twice as effective as the old, owing to the superior size and speed of the ships.

No comment need be made on the importance attached by Australia to the possession of an efficient and up to date merchant fleet.

#### CANADIAN GOVERNMENT MERCHANT MARINE.

In the British Board of Trade Report already mentioned is the following pertinent comment: "Our findings and recommendations are accordingly based on two hypotheses, neither of which is likely to be contradicted, the first, that the maritime ascendancy of the Empire must be maintained at all costs, and the second, that the grave wastage sustained by the merchant marine during the war must, therefore, be repaired without delay"; as was shown in last year's report Britain's adverse balance of trade in pre-war times was offset practically entirely by the earnings of her merchant marine, coupling this fact with the axioms laid down by the British Board of Trade Committee, it is manifest what a benefit to the Empire as a whole the shipbuilding activities of the dominions are likely to be, and in particular the very handsome beginning made by Canada.

The tonnage built by the dominions frees an equal amount of British tonnage to resume the sea carrying trade on routes which had to be more or less abandoned during the stress of war.

In another part of this report under the heading "Canadian Government Shipbuilding Programme, 1919-20," will be found a detailed statement of the Canadian Government fleet of merchant ships built and building, comprising 63 vessels in all; the total cost of these vessels is \$73,029,435, the total deadweight tonnage 380,435, and the average cost per deadweight ton, \$191.96.

Recently the British Government sold to France 40 steel freighters, some of them built in Canada for the Imperial Munitions Board, at an average rate of \$185 per ton; in Japanese yards the present cost of steel vessels is \$187 per ton; in British yards the smaller freighters ranging from 3,000 to 4,000 tons are selling at \$190 per ton; the cost of the Canadian ships, taking everything into account, compares, therefore, not unfavourably with that of ships from British and Japanese yards, and favourably with the cost of the output of American yards, which runs from \$200 to \$220 per ton for steel freighters.

This fleet of 63 ships is made up as follows: Two ships of 10,500 tons building at the Halifax Shipyards; 25 of 8,390 tons, 10 of these are building at Canadian Vickers, Montreal, 6 by Coughlan and Sons, Vancouver, 2 at Halifax Shipyards, 2 at Prince Rupert, 2 at Victoria, 2 by Wallace Shipyards, Vancouver, and 1 by Davie S. R. Company, Levis, P.Q.; 8 of 5,100 tons, 4 building by Tidewater Shipbuilding Co.; 2 by Wallace Shipyards, and 2 by Davie S. R.



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Company; 6 of 4,575 tons, 2 at Vickers, Ltd., 2 at Port Arthur, and 2 by British American Shipbuilding Company; 1 of 4,540 tons by Wallace Shipyards; 1 of 4,485 tons by the same firm; 9 of 3,990 tons, 7 by Collingwood Shipbuilding Co., 1 at Midland, and 1 at Port Arthur; 2 of 3,890 tons at Collingwood; 2 of 3,500 tons by the Dominion Shipbuilding Co., Toronto; 4 of 3,400 tons at Port Arthur, and 3 of 2,800 tons by the Nova Scotia S. & C. Company.

With the acquisition by the Canadian Government of the Grand Trunk, Grand Trunk Pacific, and the Canadian Northern Railways, the Canadian merchant fleet will serve as a feeder to these lines, and complete a great national transportation system by land and sea.

At the beginning of December, 1919, there were 12 Canadian freighters plying to Buenos Ayres, Montevideo, Barbados, Trinidad, Havana, Kingston (Jamaica), and Liverpool, Eng.; a rapid increase of trade having developed recently between Canada, and South America and the West Indies; the names and the deadweight tonnage of these vessels are: *Canadian Voyageur*, 4,575; *Canadian Pioneer*, 8,390; *Canadian Warrior*, 3,990; *Canadian Volunteer*, 4,485; *Canadian Trooper*, 4,540; *Canadian Recruit*, 3,990; *Canadian Signaller*, 3,990; *Canadian Trader*, 3,400; *Canadian Sailor*, 3,400; *Canadian Ranger*, 8,390; *Canadian Seigneur*, 8,390; *Canadian Miller*, 8,390.

At the end of the fiscal year 1919-20, Canada will have in commission a fleet of about 25 merchant ships plying not only to Britain, South America, and the West Indies, but also to Japan, Australia, South Africa, and India; India already contemplates a preference to Britain and the dominions on hides and skins, and Australia has a large surplus of wheat, wool, and meat and food-stuffs awaiting transshipment.

Although in February, 1919, there was a very considerable drop in ocean freight rates, they are still high as compared with pre-war standards, and for some years to come, until really keen competition occurs in the world's sea carrying trade, are likely to remain so; the earnings of the Canadian merchant marine by that time, ought to insure it a sufficient reserve to cover depreciation, and to meet competition in the world's markets.

## FOREIGN SHIPBUILDING BY CANADIAN YARDS.

The details of the building of steel and wooden ships for the British merchant marine by Canadian yards under the control of the Imperial Munitions Board, with a representative of the Ministry of Shipping, as expert advisor, are now available; in all 88 ships with a total deadweight tonnage of 349,163 were built. This total included 46 wooden vessels, tonnage 142,600, and 42 steel vessels, tonnage 206,563.

In order to cope successfully with this large building programme, all existing steel Canadian shipbuilding plants with one or two exceptions, were enlarged and improved, and new plants were organized at Bridgeburg, Ont., at Welland, Ont., under the title British American Shipbuilding Co., and at Midland, Ont. The intention at first was to build only steel vessels, but as tonnage requirements became more pressing, owing to heavy submarine losses, it was decided to build wooden ships as well.

The wooden shipbuilding in the east was undertaken by general contractors, who had first of all to establish their yards; and was carried out as follows, the vessels being standardized and built to a common plan: Grand and Horne, St. John, N.B., 2 vessels; Quinlan and Robertson, Quebec, 4; Quebec Shipbuilding and Repair Co., Ltd., 2; Three Rivers Shipyards, 2; Fraser, Brace & Co., Ltd., Montreal, 4; Toronto Shipbuilding Co., Ltd., 2; Great Lakes Dredging



Co., Ltd., Fort William, 2; Southern Salvage Co., Liverpool, N.S., 1; total, 19 vessels, 58,900 tons.

Wooden shipbuilding operations on the Pacific coast comprised 5 ships of 3,100 tons built by the Foundation Co., Victoria, B.C.; 4 of 3,100 by the Cameron Genoa Co., Victoria, 4 of 3,100 by New Westminster Construction Co.; 6 of 3,100 by the Western Canada Construction Co.; 2 of 3,100 by the Pacific Construction Co., Coquitlan; 6 of 3,100 by William Lyall Shipbuilding Co., North Vancouver; total, 27 vessels, 83,700 tons.

In the steel plants Canadian Vickers, Montreal, built 4 ships of 7,000 tons each; J. Coughlan & Sons, Vancouver, 9 of 8,800; Wallace Shipyards, North Vancouver, 1 of 4,500 and 2 of 4,600; Port Arthur Shipbuilding Co., 1 of 4,300 and 6 of 3,400; Collingwood Shipbuilding Co., 2 of 2,900; Midland Shipbuilding Co., 3 of 3,400; British American Shipbuilding Co., Welland, 3 of 3,500; Canadian General Electric Co., Bridgeburg, 2 of 3,500; Polsons Iron Works, Ltd., 6 of 3,500; Nova Scotia Steel and Coal Co., New Glasgow, 1 of 1,800 and 1 of 2,400; Car Ferry, Leonard, purchased 1 of 2,263 tons; total, 42 ships, 206,563 tons.

The British Government expended \$70,000,000 for the 349,163 tons of merchant shipping built in Canadian yards under the auspices of the Imperial Munitions Board, at an average cost of \$200.48 per deadweight ton. As will be seen in another part of this report, under the heading "Canadian Government Shipbuilding Programme 1919-20," the cost per deadweight ton of the 380,435 tons built and building for the Canadian Government merchant marine is \$191.96.

During the calendar year 1919, 80 vessels, with a total net tonnage of 99,340, were built in Canadian yards for foreign Governments; 2 of these were wooden sailing vessels, 60 steam wooden vessels, and 18 steel steamships; more than half the wooden vessels were built in Pacific Coast yards for the French Government.

The official returns follow:—

NUMBER AND TONNAGE OF NON-REGISTERED VESSELS REPORTED TO OTHER COUNTRIES, 1919.

	Wood.				Steel and Steam.	
	Sail.		Steam.			
	No.	Tonnage.	No.	Net Tonnage.	No.	Net Tonnage.
British Columbia.....			43	50,660	3	12,723
Ontario.....					8	6,083
Quebec.....			10	8,102	7	11,265
New Brunswick.....			5	6,999		
Nova Scotia.....	2	747	2	2,761		
	2	747	60	68,522	18	30,071
Total number of vessels.....				80		
Total tonnage.....				99,340		



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## CANADIAN GOVERNMENT SHIPBUILDING PROGRAMME 1919-20.

## CONTRACTS AUTHORIZED BY ORDER IN COUNCIL.

Yard No.	Name.	Builders.	Date of Contract.	D.W. Ton.	Cost per Ton.	Total Cost.	Remarks.
66	Canadian Voyageur.	Vickers.....	Mar. 4, 1918	4,575	207 00	947,025	Complete and in commission.
67	Canadian Pioneer...	"	May 22, 1918	8,390	180 00	1,510,200	"
61	Canadian Warrior...	Collingwood..	May 18, 1918	3,990	205 00	817,950	"
100	Canadian Volunteer	Wallace.....	Mar. 15, 1918	4,485	207 00	928,395	"
106	Canadian Trooper.....	"	Nov. 25, 1918	4,510	217 00	985,180	"
101	Canadian Aviator.....	"	Nov. 25, 1918	5,100	210 00	1,071,000	"
102	Canadian Raider.....	"	Nov. 25, 1918	5,100	210 00	1,071,000	"
62	Canadian Recruit.....	Collingwood..	July 5, 1918	3,990	205 00	817,950	"
63	Canadian Signaller...	"	Oct. 17, 1918	3,990	205 00	817,950	"
64	Canadian Gunner.....	"	Oct. 17, 1918	3,990	205 00	817,950	"
5	Canadian Settler.....	Tidewater....	Aug. 9, 1918	5,100	200 00	1,020,000	"
6	Canadian Rancher.....	"	Aug. 9, 1918	5,100	200 00	1,020,000	Completed.
7	Canadian Fisher.....	"	Jan. 24, 1919	5,100	200 00	1,020,000	"
8	Canadian Forester.....	"	Jan. 24, 1919	5,100	200 00	1,020,000	"
459	Canadian Trapper.....	Davie.....	Sept. 4, 1918	5,100	200 00	1,020,000	Completed.
460	Canadian Hunter.....	"	Sept. 4, 1918	5,100	200 00	1,020,000	"
39	Canadian Trader.....	Port Arthur..	Sept. 4, 1918	3,400	205 00	697,000	Complete and in commission.
40	Canadian Sailor.....	"	Sept. 4, 1918	3,400	205 00	697,000	"
41	Canadian Adventurer...	"	Mar. 1, 1919	3,400	210 00	714,000	"
42	Canadian Sower.....	"	Mar. 1, 1919	3,400	210 00	714,000	"
1	Canadian Mariner.....	Halifax ....	Sept. 13, 1919	8,390	195 00	1,636,050	"
2	Canadian Explorer.....	"	Sept. 13, 1919	8,390	195 00	1,636,050	"
73	Canadian Navigator...	Vickers.....	Oct. 11, 1918	4,575	215 00	983,625	Complete and in commission.
68	Canadian Ranger.....	"	Oct. 11, 1918	8,390	188 00	1,577,320	"
69	Canadian Seigneur.....	"	Oct. 11, 1918	8,390	188 00	1,577,320	"
70	Canadian Miller.....	"	Oct. 11, 1918	8,390	188 00	1,577,320	"
71	Canadian Spinner.....	"	Oct. 11, 1918	8,390	188 00	1,577,320	"
72	Canadian Planter.....	"	Oct. 11, 1918	8,390	188 00	1,577,320	Completed.
1	Canadian Winner.....	Victoria ....	Jan. 24, 1919	8,390	198 00	1,661,220	"
2	Canadian Traveller....	"	Jan. 24, 1919	8,390	198 00	1,661,220	"
15	Canadian Beaver.....	Collingwood..	Dec. 11, 1918	3,990	205 00	817,950	"
43	Canadian Runner.....	Port Arthur..	Mar. 1, 1919	4,575	215 00	983,625	"
44	Canadian Carrier.....	"	Mar. 1, 1919	4,575	215 00	983,625	"
11	Canadian Importer.....	Coughlan ....	Nov. 22, 1918	8,390	198 00	1,661,220	Complete and in commission.
12	Canadian Exporter.....	"	Nov. 22, 1918	8,390	198 00	1,661,220	"
13	Canadian Inventor.....	"	Nov. 22, 1918	8,390	198 00	1,661,220	"
14	Canadian Prospector...	"	Nov. 22, 1918	8,390	198 00	1,661,220	"
3	Canadian Cruiser.....	Halifax.....	Dec. 10, 1918	10,500	197 50	2,073,750	"
4	Canadian Constructor...	"	Dec. 10, 1918	10,500	197 50	2,073,750	"
5	Canadian Sealer.....	Nova Scotia..	Mar. 31, 1919	2,800	210 00	588,000	Completed.
6	Canadian Miner.....	"	Mar. 31, 1919	2,800	210 00	588,000	"
1	Canadian Reaper.....	Prince Rupert	Feb. 21, 1919	8,390	198 00	1,661,220	"
2	Canadian Thrasher.....	"	Feb. 21, 1919	8,390	198 00	1,661,220	"
4	Canadian Otter.....	British Ameri can.	Jan. 23, 1919	4,575	215 00	983,625	"
5	Canadian Squatter.....	"	Jan. 23, 1919	4,575	215 00	983,625	"
65	Canadian Farmer.....	Collingwood..	July 1, 1919	3,990	180 00	718,200	"
66	Canadian Observer.....	"	July 1, 1919	3,990	180 00	718,200	"
10	Canadian Pathfinder...	Dominion....	July 11, 1919	3,500	180 00	630,000	"
11	Canadian Engineer.....	"	July 11, 1919	3,500	180 00	630,000	"
77	Canadian Victor.....	Vickers.....	Sept. 18, 1919	8,390	170 00	1,426,300	"
78	Canadian Conqueror...	"	Sept. 18, 1919	8,390	170 00	1,426,300	"
79	Canadian Commander...	"	Sept. 18, 1919	8,390	170 00	1,426,300	"
80	Canadian Leader.....	"	Sept. 18, 1919	8,390	170 00	1,426,300	"
10	Canadian Racer.....	Midland.....	Feb. 26, 1920	3,890	180 00	718,200	"
103	Canadian Highlander...	Wallace.....	Mar. 18, 1920	8,390	167 50	1,405,325	"
104	Canadian Skirmisher...	"	Mar. 18, 1920	8,390	167 50	1,405,325	"
67	Canadian Rover.....	Collingwood..	Mar. 13, 1920	3,890	182 50	709,925	"
16	Canadian Coaster.....	"	Mar. 13, 1920	3,890	182 50	709,925	"
8	Canadian Challenger...	Nova Scotia..	Feb. 2, 1920	2,800	190 00	532,000	"
476	Canadian Challenger...	Davie.....	Feb. 2, 1920	8,390	167 50	1,405,325	"
45	Canadian Challenger...	Port Arthur..	Feb. 26, 1920	3,890	182 50	709,925	"
20	Canadian Transporter...	Coughlan....	.....	8,350	167 50	1,398,625	"
21	Canadian Freighter....	"	.....	8,350	167 50	1,398,625	"

Total Number of Contracts.....	63
Total D.W. Tonnage.....	380,435
Total Value—63 Vessels.....	\$73,029,435
Average cost per ton.....	\$191 96



CANADIAN REGISTERED MERCHANT VESSELS CAPTURED OR DESTROYED BY THE ENEMY.

(S) Sailing Vessel. Others unless otherwise noted, Steam.

Name.	Tons.	Date.	Position.	Cause of Loss.	How Attacked.	How Sunk.	Lives Lost.
Drummuir (S)	1,844	Dec. 2, 1914	70 miles E. by N. (true) from Cape Horn	Luapize	Captured.	Bombs.	1
Morwenna	1,414	May 26, 1915	72 miles S. by E. from Fastnet	Submarine	"	Torpedo	
L. C. Tower (S)	518	July 1, 1915	30 miles S. from Fastnet.	"	No warning.	Set on fire	132
Royal Edward	11,117	Aug. 13, 1915	6 miles W. from Kandelaria	"	Captured.	Torpedo	
Midland Queen	1,993	" 4, 1915	70 miles S.W. by W. from Fastnet	"	Captured.	Gun fire.	
H. C. Henry	4,219	Sept. 28, 1915	50 miles S. 3 E. from C. Matapan	"	"	"	
Empress of Port William	2,181	Feb. 27, 1916	2 miles S. from Dover pier	Mine	Mine	Mine	
Empress of Midland	2,224	Mar. 13, 1916	9 miles S. from Kenish Knock L.V.	"	"	"	
Eretia	3,464	May 13, 1916	15 miles S.W. from The D'Yeu	Submarine	Captured.	Bombs.	
Palacio	3,286	Dec. 2, 1916	18 miles E.-N.E. from Fastnet	Mowe.	"	Not known	
Duchess of Cornwall (S)	152	" 6, 1916	620 miles W. 3 S. (true) from Fastnet	Submarine	"	Gun fire.	
Harry W. Adams (S)	127	" 24, 1916	46 miles N.W. by N. from C. Villano	St. Theodore	"	Not known.	Crew made prisoners.
Jean (S)	215	" 30, 1916	60 miles E. (true) from St. Paul rocks	after conversion into tender by Mowe	"		
Lilian H. (S)	467	Jan. 19, 1917	15 miles S. by E. from Old Head of Kinsale	Submarine	"	Bombs	
Perce (S)	364	" 28, 1917	150 miles N.E. by N. (true) from St. Paul rocks.	Seadler	"	Gun fire	
Dundee	2,278	" 31, 1917	10 miles N. by W. from St. Ives Head	Submarine	No warning.	Torpedo	1
Mayola (S)	146	Feb. 16, 1917	50 miles S.E. by E. from Cape St. Vincent	"	Captured.	Bombs.	
British Yeoman (S)	1,953	" 26, 1917	230 miles N.W. by N. 3 N. (true) from St. Paul's rock	Seadler	"	Gun fire.	
James Burton Cook (S)	133	Mar. 10, 1917	25 miles S. S. 1 E. from Malaga	Submarine	"	Mine	
Kwasind	2,211	" 11, 1917	Off Southwold	"	Captured	Bombs	9. Master, chief and 3rd engineers made prisoners.
Stratheona.	1,881	April 13, 1917	145 miles W-N-W. from Ronaldshay	Submarine	"		
Victoria (S)	165	" 16, 1917	30 miles S.W. from Beachy Head	"	"	"	
Thomas (S)	132	" 18, 1917	40 miles S.E. from Cape St. Vincent	"	"	"	
Neepawa.	1,799	" 22, 1917	120 miles W. from Bishop rock	"	"	"	
Invermay (S)	1,471	" 25, 1917	40 miles N.W. by N. from Cape de la	"	"	"	
C. A. Jaques	2,105	May 1, 1917	26 miles W-S.W. from Boulogne	"	No warning	Torpedo	3
Carnmoney (S)	1,299	" 11, 1917	150 miles W. from Fastnet	"	Captured	Bombs.	
Dorothy Duff (S)	186	" 16, 1917	14 miles from Cape Gullera	"	"	"	
McClure (S)	220	" 24, 1917	30 miles E. by S. from Cape Carbonara	"	"	"	
Scottish Hero	2,205	June 10, 1917	140 miles W. by S. 1 S.	"	"	Gun fire.	1
Willena Gertrude (S)	317	July 21, 1917	120 miles S. by E. 1 E. from Ste. Maria, Azores.	"	"	Bombs	
Percy B. (S)	330	Sept. 29, 1917	180 miles N. 3 W. from Cape Villano	"	"	Gun fire.	
Hilda B. (S)	100	Nov. 5, 1917	20 miles S. from Cape St. Mary	"	"	Bombs.	
D. A. Gordon	2,301	Dec. 11, 1917	14 miles E. S. E. from Cape de la Huertas	"	No warning	Torpedo.	1
W. C. McKay (S)	145	Jan. 10, 1918	Off the Azores	"	Not known.	Not known	6
Armonia.	5,226	Mar. 15, 1918	38 miles S. E. by E. 1 E. from Porquerolles island	"	No warning.	Torpedo.	7
Tagona	2,004	May 16, 1918	5 miles W-S.W. from Trevoze Head	"	"	"	8
Ruth Hickman (S)	117	" 21, 1918	60 miles N-N.W. (true) from Graciosa (Azores).	"	Captured.	Bombs.	
Dornfontein (Motor)	766	Aug. 2, 1918	25 miles W-N.W. from Brier island, N.S.	"	"	Burnt	3
Freshfield	3,445	" 5, 1918	4 miles N.E. by N. from Cape Colonne, Italy	"	No warning	Torpedo.	2
Luz Blanca	4,868	" 5, 1918	35 miles S.W. from Outer gas buoy, Halifax	"	"	"	25
Acadian.	2,305	Sept. 16, 1918	11 miles S.W. by W. from Trevoze Head	"	"	"	
Industrial (S)	330	Oct. 1, 1918	250 miles S.E. 1 S. (true) from Nantucket island.	"	Captured.	Bombs.	
Total	74,323	gross tons.					199



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FISHING VESSELS CAPTURED OR SUNK.  
(All Sailing Vessels except the "Triumph").

Name.	Tons.	Date.	Position.	Cause of Loss.	How Attacked.	How Sunk.	Lives Lost.
Nelson A.	72	Aug. 4, 1918.	25 miles from Shelburne.	Submarine	Captured	Bombs.	
Triumph.	239	" 20, 1918.	60 miles SW. by S. from Cape Canso.	"	"	Converted into raider.	
Uda A. Saunders.	125	" 20, 1918.	52 miles S. from Cape Canso.	Submarine	"	Bombs.	
Lucille M. Schnare.	121	" 20, 1918.	52 miles S. from Cape Canso.	(Triumph). Submarine	"	"	
Pasadena.	91	" 21, 1918.	70 miles S-SW. from Cape Canso	(Triumph). Submarine	"	"	
E. B. Walters.	98	" 25, 1918.	25 miles W. by S. from Little Miquelon.	"	"	"	
C. M. Walters.	107	" 25, 1918.	25 miles W. by S. from Little Miquelon	"	"	"	
Verna D. Adams.	132	" 25, 1918.	25 miles W. by S. from Little Miquelon.	"	"	"	
Clayton W. Walters.	80	" 25, 1918.	Off St. Pierre.	"	"	"	
Marion Adams.	99	" 25, 1918.	Off St. Pierre.	"	"	"	
Gloaming.	100	" 26, 1918.	70 miles S-SW. from St. Pierre.	"	"	"	
Elsie Porter.	136	" 30, 1918.	290 miles E. 1/4 N. from St. John's, Nfld.	"	"	"	
Potentate.	136	" 30, 1918.	290 miles E. 1/4 N. from St. John's, Nfld.	"	"	"	
Total.....13	1,536	gross tons.					No lives lost.



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DOMINION IRON AND STEEL COMPANY'S NEW ROLLING MILL PLANT, SYDNEY,  
CAPE BRETON.

On the 19th February, 1920, there transpired at Sydney an event of the utmost importance to the Canadian steel and shipbuilding trades, and another milestone in the industrial progress of Canada was passed; on that date in the above plant there was rolled the first Canadian steel ship's plate for one of the 10,500-ton Government Merchant Marine vessels being built at the Halifax Shipyards.

The steel ingot from which this plate was rolled weighed 5,700 pounds, and the dimensions of the plate were, length 331 inches, width 72 inches, thickness 0.64 of an inch; the weight of the finished plate ready for shipment was 4,400 pounds.

The new plant of the Dominion Iron and Steel Company covers about five acres of ground, is capitalized at \$5,000,000, and is unsurpassed by any other plant in America in up-to-date efficiency; it is the last word in modern roller plate mills.

The process of rolling this steel ship's plate was briefly this: The red hot ingot was grappled at the furnace door and swung on to a 10-ton Morgan crane, by which it was lowered to a moving platform and carried to the rolling mill proper, where the pressure is applied by revolving cylinders driven by the fly-wheel of a 4,000 horse-power motor, and played upon by continuous streams of water from above; as the ingot surged back after its first passage under the turning tons of metal, it was aligned on the carriage by men with iron rods, and ready for the next plunge.

Under the terrific pounding of the cylinders the ingot gradually assumed a plate shape, when the process of lengthening and flattening grew more rapid cumulatively, until the required thinness was attained; this was indicated by a micrometer at the top of the mill, the signal to stop rolling was then given, the thickness of the plate checked by a gauge applied to the side, and it was moved on, now at a dull red heat, to the straightening machine to be given a perfectly even surface.

It then passed to the horizontal rotary shearing machine which clipped both sides at once, and then to the vertical shearing machine or guillotine, which performed the same operation to the ends of the plate; it was then moved to what is termed the castor bed, a platform studded with iron rods a few feet apart, about 3 feet in height, and about one inch in diameter; on the top of each rod a castor is set at an angle, and on these castors the heaviest plates can be moved by means of iron rods with the greatest ease to the weighing machines. On being weighed, the plate is stamped and numbered, and deposited on the floor of the plant ready for shipment.

The time that elapsed from the taking of the ingot from the furnace to the depositing of this first plate rolled on the floor of the plant was almost exactly ten minutes.

The capacity of the mill is about 50,000 square feet of plate a day, varying in thickness from three-sixteenths of an inch to  $2\frac{1}{4}$  inches, and the maximum width of plate that can be rolled is 96 inches; the plates that can be turned out include all kinds for ships, bridges, boilers, or steel cars.

The department is indebted to Mr. K. H. Marsh, Chief Engineer of the Dominion Iron and Steel Company's Plant at Sydney, Cape Breton, for the description of the roller plate mill proper, and for the general description of the plant here given.

## DESCRIPTION OF ROLLER PLATE MILL.

The 110-inch by 36-inch three-high plate mill at the plant of the Dominion Iron and Steel Co. is of the Lauth type and consists of one stand of rolls served



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by tilting tables and driven by a 4,000 horse-power 83 R.P.M. motor through a set of cut herring-bone pinions. The middle pinion is driven by the motor while the upper and lower pinions are connected to the upper and lower mill rolls respectively through leading spindles and coupling boxes. The pinion gear reduction is about 10 to 6 so that the mill is driven at about 49 R.P.M. The top and bottom rolls are 36-inches in diameter and the middle roll is 24 inches in diameter; the length of all rolls is 110 inches between necks, and the horizontal distance between mill housings is about 113 inches, thus the widest sheared plate that it is commercially practical to produce is about 96 inches. The mill screw down drive is located on top of housings and consists of two 100 horse-power motors connected to common shaft and driving the screws through a worm wheel reduction. These motors are electrically connected for series parallel operation. The front and back tilting tables are each about 30 feet in length and each supports 21 live rolls. Two 60 horse-power motors drive the live rolls on each tilting table. The power for raising and lowering the tilting tables is supplied by two 150 horse-power motors acting through a gear reduction and a crank motion. The tables are balanced by a closed hydro pneumatic system acting on the crank motion through hydraulic cylinders and a hydraulic accumulator. The top roll is hydraulically balanced while the middle roll is mechanically balanced and electrically raised and lowered by means of two 150 horse-power motors.

The mill motor is the General Electric Co.'s Type 1—88 pole—4,000 horse-power—82 R.P.M.—Induction—3-Phase—60-Cycle—Form M—6,600 Volt. The flywheel is direct connected, mounted between its own bearings and weighs approximately 155 000 pounds. This flywheel has a diameter of 22' 7" while the rotor has a diameter of 21' 4". The  $WR^2$  of rotating parts is approximately 20,000,000. The maximum running torque in pounds at 1' radius is 700,000.

The 1,000 kilowatt motor generator set is provided for furnishing direct current at 250 volts for all other motors used for the mill and its auxiliaries. The General Electric Co. have supplied the entire electrical equipment while the United Engineering & Foundry Co. supplied the mill proper together with tables, transfers, conveyers, shears, etc.

## GENERAL DESCRIPTION OF PLANT.

A slab yard and ingot storage, 80 feet by 200 feet, is provided adjacent to the north end of the mill buildings. This yard is served by a Morgan Engineering Company's 10-ton 3-motor E.O.T. crane. Narrow gauge tracks from the open hearth department pass under this crane and extend into the furnace building, so that hot ingots may be taken direct from the open hearth to the furnaces, or ingots may be stored in the slab yard and later rehandled on cars to the heating furnaces.

The heating furnace building is 140 feet by 227 feet in plan and contains six gas-fired regenerative side door heating furnaces, 11 feet and 7½ inches wide by 51 feet long inside buckstays, the width of furnace inside brickwork is 9 feet and the length of furnace hearth is 34 feet. Gas and air regenerative chambers of ample proportions are provided underneath each of these furnaces and each furnace is supplied with a self-supporting steel draught stack 5 feet 0 inches inside diameter of brickwork and 130 feet high above the furnace hearth level. Manually operated revolving valves are used. Debenzolized coke-oven gas with a thermal value of 560 B.T.U. is used for fuel. This gas is not preheated and both air and gas regenerators are used for pre-heating air. However, the arrangement of valves, flues and ports is such that both gas and air may be regenerated in case producer gas is used for fuel. Each furnace has four brick-lined cast-iron doors, 8 feet 6 inches centre to centre, the width between door jambs being



6 feet and the clear height from foreplate to skewback is 4 feet. The furnace doors are individually operated and controlled by General Electric Co.'s motors acting through a worm-gear crank motion. The water-cooled door jamb and skewbacks are welded steel—Blaw-Knox patent.

For average operation it is estimated that the coke-oven gas consumption will be 9,000 cubic feet per ton of ingots heated, while the water consumption per furnace for jambs and skewbacks will be about 120,000 imperial gallons per 24 hours. Venturi meters of the recording-indicating and integrating type are used for measuring both gas and water on these heating furnaces.

Two Morgan Engineering Company's 10-ton, 5-motor revolving slab chargers, having a span of 55 feet, are arranged to serve the six heating furnaces in conjunction with an electrically operated ingot chariot arranged on the centre-line between furnaces. This ingot chariot and all 24 furnace door hoists are remotely controlled from a pulpit at the north end of furnace building. All heating furnaces are arranged in plain view of the mill operator—a very desirable feature from the standpoint of operating efficiency.

The mill building proper is 80 feet 10 inches by 250 feet in plan and houses the mill motor, mill proper together with its tilting tables and auxiliaries, operating pulpit, roll shop, roll rack, salt bin and scale pit. The entire building is commanded by a Morgan Engineering Company's 6-motor E.O.T. crane equipped with 50-ton main hoist and 10-ton auxiliary hoist. A brick wall separates the motor room from the mill proper. This wall extends from floor level nearly to the crane girders; a fireproof canvas curtain being arranged to close the opening between the top of this wall and the roof, so that by raising this curtain the 75-ton crane may serve the motor room. The standard gauge railroad tracks are arranged under either end of the 75-ton crane runway.

The hot-bed building, about 100 feet in width by 560 feet long, is arranged with a crane runway its entire length for a Morgan Engineering Company's 10-ton, 3-motor, E.O.T. crane. A standard gauge railroad track is arranged to enter this building underneath the crane runway. Plate mill machinery housed by this building consists of the runout tables, plate leveller, hot-bed chain conveyer, inspection turn-up, layout chain conveyer, rotary shears and tables for the same.

The shear building is 300 feet by 350 feet in plan and is arranged for its entire length with three 96 feet 6 inch crane runways, each supporting a Morgan Engineering Company's 5-motor, double trolley, E.O.T. crane. This building houses the 108 inch by  $3\frac{1}{4}$  inch cross-cut shears, 156 inch by  $1\frac{1}{4}$  inch trimming shears, 144 inch by  $2\frac{1}{4}$  inch trimming shears, 5 scrap shears and 2 10-ton dial scales. The castor bed is arranged for the easy handling of plates from all shears to the scales. There are excellent track facilities for shipping, and a considerable plate storage space so necessary for economical plate mill operation.

The entire plate mill machinery, including roll lathe, was furnished by the United Engineering & Foundry Co., of Pittsburg, Pa., with the exception of the 144 inch shear, which was furnished by the Morgan Engineering Co., of Alliance, Ohio. All cranes and mill machinery is motor-driven with General Electric Company's 230-volt equipment. Auxiliary apparatus, such as shear plate grinder, test piece milling machine, air compressor, hydraulic pump, etc., is motor-driven.

The brick building walls are not less than 12 inches thick. Ample windows are provided with wooden sash and wooden frames. Reinforced concrete lintels and plain concrete window sills were used throughout. The roof consists of  $2\frac{3}{4}$  inch tongued and grooved spruce supported by channel purlins and covered with a "Barrett" specification 4-ply tar and gravel roof.

The fresh water supply required for this mill is about  $1\frac{1}{2}$  million imperial gallons per twenty-four hours. The cooling-water for heating furnaces is



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returned to a cooling pond and recirculated, while the mill cooling-water, which is contaminated with mill scale, grease and salt, is run into the sewer.

Power for plate mill operation is supplied by a General Electric 5,000 K.W. turbo-generating unit in No. 3 power-house and is transmitted about one mile at 6,600 volts.

Extensions to the open hearth building were necessary, in order to provide room for bottom casting the slab ingots required for plate mill consumption. The entire project represents the latest practice in the art of plate manufacture and is a creditable addition to the steel plant of the Dominion Iron and Steel Company, Ltd.

## OPERATIONS OF CHIEF CANADIAN SHIPBUILDING PLANTS.

## MIDLAND SHIPBUILDING CO., LTD., MIDLAND, ONT.

This company turned out during the calendar year 1919 two vessels for the Imperial Munitions Board, the *War Leveret*, deadweight tonnage 3,348, length 251 feet, approximate cost \$700,000.00, and the *War Fury*, deadweight tonnage 3,345, length 251 feet, approximate cost \$700,000.00.

## HALIFAX SHIPYARDS, LIMITED, HALIFAX, N.S.

Are building for the Canadian Government Merchant Marine two ships of 8,100 deadweight tons each, and two of 10,500 deadweight tons each.

## CANADIAN CAR AND FOUNDRY CO., LTD., MONTREAL, P.Q.

During the fiscal year 1919-20 this shipbuilding plant completed the steamer *E. D. Kingsley*, 1,500 tons deadweight, length over all 209 feet, speed 10 knots loaded.

## YARROWS, LIMITED, VICTORIA, B.C.

This plant completed during the year a motor-driven steel ferry for Mission, B.C.; length 90 feet, beam 25 feet, depth 5 feet, approximate cost \$35,000; was also engaged in repair work to local and ocean-going ships.

The following additions have been made to the plant: One new compressor building 44 feet by 40 feet with 200 horse-power electrically-driven compound air compressor installed. One electrically operated shipyard crane, 90 feet radius. A powerful electric welding plant consisting of two 200-ampere portable machines for direct current welding.

The administrative offices were enlarged and a new drawing office built.

A Fay and Egan Universal shipyard saw was installed for cutting heavy timbers.

## NOVA SCOTIA STEEL &amp; COAL CO., NEW GLASGOW, N.S.

Completed three ships 2,800 tons deadweight each for the Canadian Government Merchant Marine; sea speed,  $9\frac{1}{2}$  knots; average cost, \$530,000.00 each.

During the year \$46,000.00 was expended in new equipment for the plant.

## DOMINION SHIPBUILDING CO., LTD., TORONTO, ONT.

During 1919 this plant built and delivered one steel ship of 4,300 tons deadweight for the N. S. Transportation Co., Ltd., Toronto; four steel ships of 3,550 tons deadweight each for the Dominion Shipbuilding Co., Ltd., Toronto, Ont., and two steel ships of 3,550 tons deadweight each for the Aalesund S.S. Co. of Aalesund, Norway.



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Vessels under construction to be delivered during 1920 comprise two ships of 3,350 tons deadweight each for the Dominion Shipbuilding Co., Ltd., Toronto; two of 2,550 tons deadweight each for the same company; two of 3,550 tons deadweight each for the Canadian Government Merchant Marine, and two of 2,550 tons deadweight each for the Gulf Navigation Co., New Orleans, La.

A new solid brick office building with draughting room was added to the plant during the year at a cost of \$30,000.

THE ST. LAWRENCE DOCK & SHIPBUILDING CO., LTD., LÉVIS, P.Q.

The firm was engaged during the year in the work of repairs and reconstruction of ships. The Government dredge *Galveston* was dismantled, rebuilt, and converted into the ocean freighter *Pomone* for the "Affréteurs Réunis" of Paris, France; length B.P. 233 feet, deadweight tonnage 3,110. The steam tug *Gwenneth* was repaired and reconstructed, and repairs made to various smaller steam tugs. The S.S. *Lehigh* was converted into a lake coal carrier for the George Hall Company of Montreal; length, B.P. 243 feet; deadweight tonnage, 2,000.

CHOLBERG SHIPYARD, LIMITED, VICTORIA, B.C.

Completed and delivered during 1919, three wooden four-masted sailing schooners for Norwegian interests; length, 197.6 feet; displacement tonnage, 2,900; approximate cost, \$220,000 each.

Have in hand a contract with Victoria, B.C., shipowners for four wooden barquentines; length over all, 250 feet; deadweight tonnage, 2,400; estimated cost, \$250,000 each.

Additions to the plant during the year were a new stiff-leg derrick, 120 feet boom, a new air compressor, a new ship band saw, a new aerial wire timber carrier, all specially designed and arranged for the construction of wooden ships.

CANADIAN VICKERS, LIMITED, MONTREAL, P.Q.

Vessels completed and delivered April 1919-20, for Canadian Government Merchant Marine:—

*Canadian Ranger*, 8,382 tons deadweight, 400' x 52' x 31'; speed, 11 knots. *Canadian Seigneur*, 8,391 tons deadweight, 400' x 52' x 31'; speed, 11 knots. *Canadian Miller*, 8,391 tons deadweight; 400' x 52' x 31'; speed, 11 knots. *Canadian Navigator*, 4,581 tons deadweight, 320' x 44' x 25'; speed, 11 knots. *Canadian Spinner*, 8,390 tons deadweight; 400' x 52' x 31'; speed, 11 knots. *Canadian Planter*, 8,390 tons deadweight; 400' x 52' x 31'; speed, 11 knots.

For French Owners:—

*Alsace*, 8,398 tons deadweight; 400' x 52' x 31'; speed, 10 knots.

Vessels under construction, 1920, for Canadian Government Merchant Marine:—

*Canadian Victor*, 8,350 tons deadweight; 400' x 52' x 31'; speed, 11 knots. *Canadian Conqueror*, 8,350 tons deadweight; 400' x 52' x 31'; speed, 11 knots. *Canadian Commander*, 8,350 tons deadweight; 400' x 52' x 31'; speed, 11 knots. *Canadian Leader*, 8,350 tons deadweight; 400' x 52' x 31'; speed, 11 knots.

For Norwegian Owners:—

*Tatjana*, 8,350 tons deadweight; 400' x 52' x 31'; speed, 10½ knots. *Loch Tay*, 8,350 tons deadweight; 400' x 52' x 31'; speed, 10½ knots. One cargo steamer, 6,350 tons deadweight; 365' x 49½' x 29'; speed, 11 knots. One cargo steamer, 6,350 tons deadweight; 365' x 49½' x 29'; speed, 11 knots.



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## NORTHERN CONSTRUCTION CO., LTD., VANCOUVER, B.C.

Five ships were built and launched during the year; length overall, 204.5 feet; speed,  $9\frac{1}{2}$  knots; deadweight tonnage, 1,500.

No extensions were made to the yard during the year.

## PORT ARTHUR SHIPBUILDING CO., LTD., PORT ARTHUR, ONT.

For the Canadian Government Merchant Marine there were built in 1919, four steel freight steamers; length over all, 260 feet; deadweight tonnage, 3,400; speed, 11 knots; and for the Department of the Naval Service of Canada, trawlers 41, 42, 43; and 44; length, 134' 7"; breadth, 23' 4"; depth, 13' 6"; 294.5 gross tons each.

Under construction for 1920 for the Canadian Government Merchant Marine, two steel freight steamers; length over all, 333' 7"; deadweight tonnage, 4,350; speed, 11 knots; and one steel freight steamer, length over all, 260' 6"; deadweight tonnage, 3,980; speed, 11 knots. Under construction for the Naval Service of Canada, two Scotch multitubular boilers for tug *W. H. Lee*, and one Scotch multitubular boiler for C.G.S. *Bayfield*.

The following additions were made to the plant during the year: boiler shop addition, 90' x 80', cost \$27,651.80; foundry addition 90' x 40', cost \$19,147.36; power-house addition, cost \$10,483.78; paint shop addition, cost \$3,386.26; plate and angle furnace, cost \$19,132.17; new heating boiler, cost \$9,277.79; plate bending rolls for capacity plates, 24 feet wide by 1 inch thick, cost \$18,000.

## J. COUGHLAN &amp; SONS, VANCOUVER, B.C.

From June, 1919, to June, 1920, this firm built and delivered 76,400 deadweight tons of steel shipping, viz., nine vessels, five of 8,800 deadweight tons each, and four of 8,100 tons deadweight each as follows:—

1919—

*July delivery*:—S.S. *War Column*, 8,800 deadweight ton steamer, built to order Imperial Munitions Board, later sold to Italian Company, and now operating as S.S. *Attavita*. Coal burner, turbine engines.

*August delivery*:—S.S. *War Company*, 8,800 deadweight tons, built to order Imperial Munitions Board, sold to French company, and now operated as S.S. *Ontario*. Coal burner; turbine engines.

*October delivery*:—S.S. *War Chariot*, 8,800 deadweight tons, built to order of Imperial Munitions Board, and now being operated as *Iocasti*, under Greek flag. Coal burner; turbine engines.

1920—

*January delivery*:—S.S. *Canadian Importer*, 8,100 deadweight tons, built to order Canadian Government; coal burner; triple expansion engines. Now on trade route, Vancouver-Australia.

*February delivery*:—S.S. *Canadian Exporter*, 8,100 deadweight tons, built to order of Canadian Government; coal burner; triple expansion engines. Now on trade route, Vancouver-Australia.

*April delivery*:—S.S. *Braheholm*, laid down to order of J. Coughlan & Sons Ltd., and sold to Swedish-American-Mexican Line. She is of the 8,800 deadweight ton type, fitted with triple expansion engines, and coal furnaces. This is believed to be the first ship of this size ever laid down by a Canadian Shipyard to the company order.

*June delivery*:—S.S. *Canadian Inventor*, 8,100 deadweight tons; triple expansion engines; coal burner. Built to order of the Canadian Government.



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S.S. *Margaret Coughlan*, 8,800 deadweight tons, built to the order of Western Canada Steamships Ltd., a subsidiary company of J. Coughlan & Sons, Ltd.; oil burner, with triple expansion engines. Will be operated by Coughlan interests, and has already been chartered.

The company has in hand two 8,800 deadweight cargo steamers, one for Swedish interests and one for the Vancouver Steamships Limited, a subsidiary of J. Coughlan & Sons, Limited, and two 8,400 deadweight tons steamships for the Canadian Government Merchant Marine. These vessels will be oil burners fitted with triple expansion engines.

CANADIAN ALLIS-CHALMERS, LIMITED, BRIDGEBURG, ONT.

The Canadian Allis-Chalmers, Limited, is a subsidiary company to the Canadian General Electric Company, Limited. The capital stock of the Canadian General Electric Company, Limited, is \$12,000,000 authorized, \$10,700,000 paid up. The shareholders of the Canadian General Electric Company, Limited, are chiefly Canadian and British with a smattering of foreigners.

The shipyard proper employs 500 men. The Canadian General Electric Company, Limited, and subsidiary companies, 6,000, made up of English, French Canadian, Scotch, and Americans

The site of the shipbuilding plant covers 42 acres on the west bank of the Niagara river, three and a half miles north of the port of Bridgeburg. The plant has a siding from the Canada Southern Railway.

During the season of 1919-20 two ocean freighters were built and delivered; length over all, 261 feet; 43' 6" beam, and 23' draught, 3,500 deadweight tons each.

The company has in hand for delivery in 1920 two steel freighters of similar tonnage and dimensions for the American Metal Transport Company of New York, U.S.A.

Shipping berths Nos. 1 and 2 permit of the building of one 575 feet freighter or two of 261 feet, as also do berths Nos. 3 and 4; so that two ships of 575 feet in length or four of 261 feet can be built at the same time.

In connection with the berths there is a fitting-out dock equipped with a set of 60-ton-shear legs.



STATISTICS OF CANADIAN SHIPPING

STATEMENT OF VESSELS BUILT IN CANADA AND REGISTERED DURING THE YEAR 1919.

Province.	Wood.						Metal.						Totals.		
	Sailing.			Steam.			Sailing.			Steam.					Gas.
	Tonnage.			Tonnage.			Tonnage.			Tonnage.			Tonnage.		
	No.	Gross.	Net.	No.	Gross.	Net.	No.	Gross.	Net.	No.	Gross.	Net.	No.	Gross.	Net.
Nova Scotia	122	44,017	39,096	7	2,014	1,209	31	1,486	3,572				163	50,517	43,877
New Brunswick	6	2,126	1,926	3	1,357	859	5	601	541				14	4,084	3,326
Prince Edward Island	3	493	458				2	28	19				5	521	507
Quebec	10	1,336	1,334	8	1,106	197	5	140	97				46	74,608	45,831
Ontario	7	1,088	1,067	10	413	256	4	56	36	3	918	750	37	17,665	10,858
Manitoba				2	175	119							4	211	143
Saskatchewan															
British Columbia	44	5,595	5,595	2	10	6	87	9,826	7,161				5	16,540	10,634
Yukon															
Totals	192	54,715	49,506	32	5,075	2,646	137	15,137	11,426	3	918	750	43	103,732	63,610
													407	179,577	127,938

VESSELS BUILT IN 1919 AND EXPORTED WITHOUT BEING REGISTERED IN CANADA.

Province.	Sailing.			Steam.			Steel.		
	Wood.			Wood.			Tonnage.		
	No.	Gross.	Net.	No.	Gross.	Net.	No.	Gross.	Net.
Nova Scotia	2	747	747	2	4,593	2,761			
New Brunswick				5	11,525	6,999			
Quebec				10	13,776	8,102	7	21,531	11,265
Ontario							8	10,545	6,083
British Columbia				43	82,818	50,660	3	17,245	12,723
Total	2	747	747	60	112,712	68,522	18	49,324	30,071



COMPARATIVE STATEMENT showing the number of Vessels and Number of Net Tons on the Registry Books of the Dominion of Canada, on December 31, in each Year from 1910 to 1919, both inclusive.

Province.	1910.		1911.		1912.		1913.		1914.	
	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.
New Brunswick.....	951	59,637	966	55,872	1,001	57,369	1,031	60,020	1,052	55,522
Nova Scotia.....	2,054	149,737	2,105	142,631	2,158	143,295	2,106	138,107	2,098	135,053
Quebec.....	1,499	189,945	1,511	193,682	1,566	227,048	1,628	247,225	1,663	259,143
Ontario.....	2,027	227,457	2,014	236,877	2,017	253,376	2,012	279,642	2,100	314,660
Prince Edward Island.....	150	10,100	149	9,683	148	9,577	149	10,071	149	10,029
British Columbia.....	1,109	105,414	1,227	122,264	1,376	136,618	1,506	15,306	1,591	147,192
Manitoba.....	94	5,565	96	6,373	95	6,096	93	5,545	103	7,999
Yukon District.....	16	2,784	15	2,708	14	2,543	15	2,940	11	2,295
Saskatchewan.....	4	290	5	356	5	356	5	356	5	529
	7,904	750,929	8,088	770,446	8,380	836,278	8,545	896,965	8,772	932,422
Province.	1915.		1916.		1917.		1918.		1919.	
New Brunswick.....	1,068	56,219	1,074	49,817	1,074	49,883	1,043	49,483	1,018	42,050
Nova Scotia.....	2,087	125,567	2,064	123,058	2,010	119,805	1,948	124,517	1,965	158,100
Quebec.....	1,590	267,897	1,452	273,770	1,391	283,942	1,318	175,235	1,340	342,424
Ontario.....	2,111	312,971	2,116	328,531	2,079	311,283	2,064	312,865	1,986	320,065
Prince Edward Island.....	158	11,518	155	10,652	157	10,955	158	10,805	158	10,726
British Columbia.....	1,643	144,835	1,687	145,525	1,734	183,002	1,928	231,513	2,006	207,708
Manitoba.....	84	7,480	95	8,953	5	530	96	9,791	89	9,160
Yukon District.....	11	2,295	11	2,295	99	9,834	8	2,040	6	1,133
Saskatchewan.....	5	530	5	530	10	2,204	5	529	5	529
	8,757	929,312	8,659	943,131	8,559	971,438	8,568	1,016,778	8,573	1,091,895



SESSIONAL PAPER No. 21

COMPARATIVE STATEMENT of Vessels built and Registered in the Dominion of Canada and their Net Tonnage during the Year ended December 31, in each Year from 1910 to 1919, both inclusive.

Province.	1910.		1911.		1912.		1913.		1914.	
	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.
New Brunswick.....	17	397	25	774	44	1,092	45	1,114	31	1,319
Nova Scotia.....	82	5,572	136	5,340	126	5,853	67	4,899	56	3,303
Quebec.....	58	7,012	30	2,726	49	5,744	62	8,667	51	6,753
Ontario.....	46	3,612	42	10,086	71	11,170	38	15,572	78	23,567
Prince Edward Island.....	2	23	4	61	1	34	3	804	2	35
British Columbia.....	84	5,177	98	7,781	128	10,647	128	9,000	97	5,867
Manitoba.....	5	490	3	902	1	546	1	18	11	2,899
Yukon District.....			1	66						
Saskatchewan.....										
	294	22,283	339	27,736	420	34,886	344	40,164	327	43,246
Province.	1915.		1916.		1917.		1918.		1919.	
New Brunswick.....	22	1,114	22	332	23	1,156	16	2,590	14	3,326
Nova Scotia.....	51	2,982	65	7,661	86	14,781	110	27,831	163	43,877
Quebec.....	49	7,790	51	8,643	32	8,058	26	9,086	46	45,831
Ontario.....	38	4,709	26	5,507	21	3,949	48	10,098	37	10,858
Prince Edward Island.....	2	24					4	78	5	507
British Columbia.....	79	2,057	65	4,487	77	17,452	192	54,889	138	23,396
Manitoba.....	5	156	15	1,573	4	881	1	39	4	143
Yukon District.....										
Saskatchewan.....										
	246	18,832	244	28,303	243	46,277	397	104,611	407	127,938



11 GEORGE V, A. 1921

STATEMENT SHOWING THE NUMBER OF VESSELS AND NUMBER OF TONS ON THE REGISTRY BOOKS OF THE DOMINION OF CANADA, ON DECEMBER 31, 1919.

Ports.	Sailing Vessels.			Steam Vessels.		
	No.	Gross Tonnage.	Net Tonnage.	No.	Gross Tonnage.	Net Tonnage.
<i>New Brunswick.</i>						
Chatham.....	378	9,125	8,843	102	4,099	2,487
Dorchester.....	2	277	262	2	8	6
Moncton.....	4	200	177	1	99	48
Richibucto.....	23	510	477	16	298	220
Sackville.....	4	302	265	3	65	45
St. Andrews.....	143	2,548	2,490	38	771	518
St. John.....	200	20,558	19,844	102	9,768	6,368
	754	33,520	32,358	264	15,108	9,692
<i>Nova Scotia.</i>						
Amherst.....	2	97	80	3	168	95
Annapolis Royal.....	16	4,322	3,809	7	395	238
Arichat.....	84	2,146	2,114	28	453	420
Barrington Passage.....	60	1,293	1,263	28	509	450
Canso.....	40	738	738	6	108	102
Digby.....	82	4,063	3,825	15	468	307
Guysboro.....	8	488	453			
Halifax.....	256	13,028	12,647	144	26,958	16,980
La Have.....	39	10,372	8,935	4	608	321
Liverpool.....	32	3,946	3,488	26	1,072	606
Lunenburg.....	242	28,513	23,248	154	3,755	2,930
Maitland.....	9	1,486	1,317	1	88	59
Parrsboro.....	60	22,247	20,451	16	2,034	1,554
Pictou.....	13	1,756	1,624	15	2,264	1,409
Port Hawkesbury.....	63	1,421	1,406	9	229	193
Port Medway.....	9	759	717	5	76	71
Shelburne.....	50	2,508	2,388	18	679	509
Sydney.....	76	4,129	3,931	40	1,670	1,089
Truro.....				1	18	7
Weymouth.....	33	9,931	8,890	12	552	431
Windsor.....	32	19,019	17,757	14	3,818	2,505
Yarmouth.....	163	4,547	4,347	50	9,377	4,596
	1,369	136,809	123,228	596	55,299	34,872
<i>Ontario.</i>						
Amherstburg.....	7	1,740	1,706	10	1,201	615
Belleville.....	3	241	217	11	241	144
Bowmanville.....	2	344	316			
Brookville.....	1	819	751	18	1,346	895
Chatham.....	4	566	556	8	339	226
Cobourg.....						
Collingwood.....	5	1,122	1,122	52	16,103	10,800
Cornwall.....				4	123	75
Deseronto.....	5	403	370	6	144	81
Dunnville.....	1	87	57			
Fort William.....	1	413	413	2	4,183	2,539
Goderich.....	6	824	824	30	1,557	1,035
Hamilton.....	3	807	780	20	9,160	5,700
Kenora.....	7	580	580	92	3,491	2,209
Kinross.....	59	8,791	7,844	116	10,595	6,244
Lindsay.....	19	1,224	1,224	26	626	416
Midland.....	7	3,681	3,166	48	59,185	39,694
Napanee.....	1	122	122			
Oakville.....	1	26	26			
Ottawa.....	131	18,742	17,808	245	45,126	23,883
Owen Sound.....	6	2,007	1,717	36	3,041	2,056
Peterboro.....	22	1,698	1,698	57	1,258	847
Pictou.....	7	2,285	2,099	12	4,893	3,298
Port Arthur.....	66	21,841	21,352	82	31,743	19,942
Port Burwell.....	1	65	65	10	341	193
Port Dover.....	3	217	217	14	500	327
Port Hope.....	2	472	472	3	36	27
Port Stanley.....				26	1,122	727
Prescott.....	9	1,473	1,345	13	2,298	1,553
Sarnia.....	11	3,547	3,288	37	28,245	17,805
Southampton.....	1	96	50	11	410	278
Sault Ste. Marie.....	40	7,951	7,663	56	20,293	13,074
St. Catharines.....	23	6,092	5,505	48	1,485	972
Simcoe.....	2	36	36	2	35	18
Toronto.....	74	15,237	13,404	300	95,605	60,472
Wallaceburg.....	2	490	475	9	381	264
Whitby.....						
Windsor.....	29	3,400	3,273	21	5,215	3,115
	561	107,439	100,541	1,425	350,321	219,524



## SESSIONAL PAPER No. 21

STATEMENT SHOWING THE NUMBER OF VESSELS AND NUMBER OF TONS ON THE REGISTRY BOOKS OF THE DOMINION OF CANADA, ON DECEMBER 31, 1919—*Concluded.*

Ports.	Sailing Vessels.			Steam Vessels.		
	No.	Gross Tonnage.	Net Tonnage.	No.	Gross Tonnage.	Net Tonnage.
<i>Quebec.</i>						
Gaspe.....	16	722	678	1	209	142
Magdalen Islands.....	11	458	449	2	149	103
Montreal.....	283	91,833	88,258	346	303,373	187,714
Paspébiac.....	17	287	282	7	210	146
Quebec.....	418	34,044	33,256	164	30,466	16,790
Sorel.....	29	10,083	9,018	46	11,803	5,588
	774	137,427	131,941	566	346,210	210,483
<i>British Columbia.</i>						
New Westminster.....	116	15,181	15,162	262	8,703	5,233
Prince Rupert.....	5	2,218	2,128	48	3,632	2,202
Vancouver.....	297	49,408	48,915	879	131,732	81,157
Victoria.....	113	22,478	21,433	286	53,003	31,478
	531	89,285	87,638	1,475	197,070	120,070
<i>Prince Edward Island.</i>						
Charlottetown.....	125	7,684	7,245	33	7,550	3,481
<i>Saskatchewan.</i>						
Prince Albert.....	1	145	145	4	660	384
<i>Manitoba.</i>						
Winnipeg.....	16	3,373	3,373	73	8,776	5,787
<i>Yukon.</i>						
Dawson.....				6	1,755	1,133

## RECAPITULATION.

Province.	Sailing Vessels.			Steam Vessels.		
	No.	Gross Tonnage.	Net Tonnage.	No.	Gross Tonnage.	Net Tonnage.
New Brunswick.....	754	33,520	32,358	264	15,108	9,692
Nova Scotia.....	1,369	136,809	123,228	596	55,299	34,872
Ontario.....	561	107,439	100,541	1,425	350,321	219,524
Quebec.....	774	137,427	131,941	566	346,210	210,483
British Columbia.....	531	89,285	87,638	1,475	197,070	120,070
P. E. Island.....	125	7,684	7,245	33	7,550	3,481
Saskatchewan.....	1	145	145	4	660	384
Manitoba.....	16	3,373	3,373	73	8,776	5,787
Yukon.....				6	1,755	1,133
Totals.....	4,131	515,682	486,469	4,442	982,749	605,426

STATEMENT showing Number of Vessels Removed from the Registry Books of the Dominion of Canada during the Year ended December 31, 1919.

Sold to foreigners.....	57
Wrecked.....	38
Stranded.....	10
Lost.....	12
Broken up.....	264
Abandoned at sea.....	10
Collisions.....	4
Foundered.....	27
Burnt.....	12
Transferred to St. John's, Nfld.....	14
"    Australia.....	1
"    Great Britain.....	23
"    Bermuda.....	1
"    British West Indies.....	5
Missing.....	5
Registry no longer required.....	4
Total.....	487

It is estimated that 45,954 men and boys, etc., inclusive of masters, were employed on ships registered in Canada during the year 1919.



REPORT OF B. H. FRASER, M.I.C.E., CHIEF ENGINEER.

OFFICE WORK.

Total plans for twelve months (April 1 to March 31, 1920).....	1,715
Charts received and recorded.....	130
Photographs received and recorded.....	340
Specifications and bills of materials written.....	80
Notices to Mariners issued (comprising 216 subjects).....	82

PUBLICATIONS.

During the fiscal year 82 Notices to Mariners, covering 216 subjects, were issued.

The following may be especially noted:—

Publication of amendments to Canadian Radiotelegraph regulations with respect to wireless watches to be maintained by ships carrying only one operator; and Notice to all Masters and Shipowners of British vessels regarding wireless requirements.

Notice regarding the retention of armament on ships of Canadian register.

Improvements of channels by dredging done by the Department of Public Works were described.

Hydrographic notes were published; also Regulations for Pilotage in British Columbia.

Notices relating to waters outside of Canada were issued covering items relating to Newfoundland, Atlantic and Pacific waters of the United States, Panama canal, Roumania, as well as notices relating to transatlantic and trans-pacific subjects.

The annual edition of the "List of Lights and Fog Signals" in three sections, was published; also a new edition of the "List of Buoys, Beacons, etc., on the Pacific Coast of Canada".

REMOVAL OF OBSTRUCTIONS TO NAVIGATION.

- Halifax.....Removal of wreck in harbour.
- St. Croix river.....The wrecked schooner *Mercedese*, which was a menace to navigation, was removed by the owners.
- St. Clair river.....The tug *Annie Moyles*, wrecked in St. Clair river, was removed by the Reid Wrecking Co., for the owners.
- Port Dover, Ont....The tug *Jim and Tom*, which formed an obstruction in the harbour, was removed by the owners.
- Rainy river.....The tug *Ethel Banning*, which sank alongside of Government wharf, was removed by the owners.

MAINTENANCE AND REPAIRS TO WHARVES.

The following is a list of wharves where repairs were attended to by this branch:—

<i>Nova Scotia.</i> Babins Cove Bear River Westport	<i>New Brunswick.</i> Lorneville St. John St. Martins Caraquet	<i>Prince Edward Island.</i> Alberton Chapel Point Georgetown Orwell Cove
<i>Ontario.</i> Kenora Lakeport Midland Providence Bay Rosseau Treadwell.	<i>Quebec.</i> Roberval Ste-Cecile du Bic St. Thomas de Montmagny Sandy Beach Ville Marie	<i>Montreal District.</i> Caughnawaga L'Orignal Montebello
		<i>British Columbia.</i> Sidnev.



## SESSIONAL PAPER No. 21

## ICE-BREAKING.

The five year contract with the Great Lakes Transportation Company, to keep the harbours at the head of lake Superior open for navigation until the 17th December in each year and to open them in the spring, as soon as the canal at Sault Ste. Marie is open for navigation, is still in force.

## CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

## NOVA SCOTIA.

Lightstation.	Nature of work.
Cape Race.....	Repairs to tower.
Coffin Island.....	Provision and installation of a Reliance clock.
Dartmouth.....	Agency buildings covered with asbestos for fire protection.
Dartmouth.....	Repairs to wharf.
Flat point.....	Installation of a second-hand boiler taken from Cape Fourchu.
Glance bay.....	Repairs to tower and dwelling.
Halifax.....	Four 20-ft. superstructures constructed for gas and whistling buoys.
Ingonish South.....	Erection of mast and shed to replace lighthouse destroyed by a storm.
Little Hope.....	Repairs to breakwater, groynes, and slipway.
Mauger beach.....	Repairs to breakwater.
Negro island.....	Repairs to lighthouse.
Negro island.....	Installation of an improved Reliance clock.
Pages island.....	Repairs to boatslip and construction of crib blocks.
Port Morien.....	Erection of pole light and provision of an anchor lantern.
Salvages.....	Repairs to roof of fog-alarm building.
Sydney bar.....	Repairs to foundation of lighthouse.

## NEW BRUNSWICK AGENCY.

## NEW AIDS TO NAVIGATION.

Green island.....	Temporary fog alarm.
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## CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

## NEW BRUNSWICK.

Boars head, N.S.....	Repairs to road and the building of a protection wall.
Cape d'Or.....	Construction of a road.
Cape Fourchu.....	Building diaphone room, installation of diaphone, re-shingling of building, etc.
Economy, N.S.....	Provision and installation of Piper pressed lens lantern.
Létite passage.....	Erection of new fog-alarm building, the steam plant replaced by oil engines and Class "B" diaphone.
Machias Seal island.....	Erection of oil-shed, installation of hoist, repairs to tramway, etc.
Parrsboro.....	Installation of 1-inch diaphone and oil engines.
Partridge Island.....	Digging drain and placing concrete block on southern section of tower.
Peases island, N.S.....	Installation of new mechanism for lighting apparatus.
Pecks point.....	Installation of new 3 horse-power engines
Tongue shoal.....	Installation of Aga lighting system.

## CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

## PRINCE EDWARD ISLAND.

Alberton.....	Re-erection of pole lights to suit conditions of the channel.
Bird rocks.....	Repairs to the landing wharf.
Brion island.....	Installation of 55 mm. Diamond burner.
Cape Anguille.....	Installation of 55 mm. Diamond burner.
Cape Ray.....	Repairs to road.
Caribou island, N.S.....	Repairs to protection work.
Cocagne, N.B.....	Pole light moved to a new site, erection of shed and construction of plank walk.
Entry island.....	New illuminating apparatus and occulting clockwork mechanism installed.
Grand Entry.....	Erection of mast range lights to replace lights destroyed by storm and provision and installation of lanterns with hoisting gear.
Murray harbour.....	Repairs to protection work.
Pictou bar, N.S.....	Erection of dwelling.
Pointe Basse.....	Erection of mast light and shed.
Point Rich.....	Installation of 55 mm. Diamond burner.
St. Peters island.....	Repairs to fence.
Shippigan gully.....	Provision of anchor lantern and hoisting gear.



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## QUEBEC AGENCY.

## NEW AIDS TO NAVIGATION.

Lightstation.	Nature of Work.
St. Ulric.....	Establishment of a pole light, with anchor lantern.

## CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

## QUEBEC.

Fame point.....	Provision and installation of complete 85 mm. installation to replace the Chance installation.
Heath point.....	Repairs to outbuildings, tower and provision and installation of 85 mm. installation to replace Chance installation.
Marcelle point.....	Construction of landing, cutting door in tower, putting anchor bolts from corner posts to wooden crib, etc.
Miscou island.....	The steam fog alarm plant replaced by an oil plant.
Moisie .....	The back range light moved to new location.
Montmagny.....	Erection of an oil shed.
Quebec Agency.....	Repairs to decking of Departmental wharf.
Riviere a la Martre.....	Installation of duplicate 10 horse-power oil engines.
Ste. Anne des Monts.....	Provision and installation of 360° Chance anchor lantern.
South point, Bagot bluff.....	Repairs to gallery of tower, etc.
Southwest point, Anticosti.....	Repairs to tower.
Table head.....	Installation of duplicate 10 horse-power engines, removal of temporary 6 horse-power engines and erection of double dwelling.
Upper Traverse.....	Repairs to pier, and installation of 55 mm. Diamond burner.

## CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

## MONTREAL.

Cape Madeleine.....	Protection work to front light foundation.
Ile de Grace.....	Repairs to lighthouse foundation.
Lachine.....	Repairs to foundation pier and runway.
Montreal Agency.....	Repairs to scows <i>Adelard</i> and <i>Sarah</i>
Sorel.....	Repairs to fire station on wharf
	Five ice buoys altered to approved pattern.
	Construction of six 9½ gas and whistling buoys.
	Construction of gas and whistling buoy.
	Construction of 6 bell buoys.
	Construction of 4 whistling buoys.
	Placing of electric lights on the wharf.

## ONTARIO AGENCY.

## NEW AIDS TO NAVIGATION.

Pointe aux Pins.....	Establishment of an unwatched light using Aga system.
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## CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

## ONTARIO.

Amherstburg.....	Repairs to bank of river on departmental property.
Bar Point lightship.....	Purchase of drifter <i>C. D. 50</i> and same converted into a lightship.
Bridge island.....	Wigham light replaced by an automatic gas beacon.
Cobourg.....	Converting tower into storehouse by cutting same down and roofing it over.
Colchester reef.....	Repairs to pier.
Davieaux Isd.....	Installation of mechanical fog bell..
Duck rock.....	Wigham light replaced by an automatic gas beacon.
Kincardine.....	Repairs to wall, and alterations and repairs to back tower.
Lionhead.....	Repairs to tower.
Little Current.....	Reconstruction of front light.
Owen Sound.....	Changing the front range light from an oil light to an electric light.
"Parry Sound" Scow.....	Repairs.
Peter rock.....	Oil light changed to an unwatched light using the Aga system.
Point Clark.....	Repairs to dwelling, stable and shed.
Pointe aux Pins.....	Apparatus improved by the installation of 4th order lens.
Port Burwell.....	Repairs to main lighthouse tower.



## SESSIONAL PAPER No. 21

## CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

ONTARIO—*Continued.*

Lightstation.	Nature of work.
Prescott.....	Experimenting with Chanteloupe Clock mechanism as bell striker. Painting and fitting up gasoline boat "Marifiscan" Equipment for fire protection. Construction of superstructure of gas and whistling buoy, and provision of 10" whistle. Construction of two gas and bell superstructures. Construction of superstructure for Prince Edward Island agency.
Rondeau.....	The oil range lights replaced by unwatched lights using the Aga system.
Thunder cape.....	Installation of a single oil unit.
Turning rock.....	Erection of unwatched beacon using the Aga system.
Western islands.....	The steam fog alarm plant replaced by oil engines.

## BRITISH COLUMBIA.

## NEW AIDS TO NAVIGATION.

Camp point.....	Establishment of an unwatched beacon using the Aga system.
David point.....	Erection of wooden slatwork lighted beacon.
Fraser river.....	Establishment of four sets of range lights to mark the improved channel leading to New Westminster.
Genn island.....	Establishment of an unwatched acetylene beacon.
Kinahan island.....	Establishment of an unwatched acetylene beacon.
Shoal point.....	Establishment of an electric fog bell.

## CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

## BRITISH COLUMBIA.

Amphitrite point.....	Installation of an unwatched light.
Beacon rock beacon.....	Re-erection of beacon.
Brockton point.....	The whole front of departmental property put in good condition.
Dryad point.....	Erection of a 25-ft. reinforced concrete tower.
Egg island.....	Repairs to cable, bridge, dwelling, etc.
First Narrows.....	Protection, work, and provision made for the storage of oil supplies.
Fraser mouth.....	Rebuilding lighthouse in a new location.
Masset.....	Reconstruction of bridge.
North Arm.....	Aga system installed in the range lights.
Porlier pass.....	Repairs to towers, boathouse, construction of stairs on the trail, etc.
Prince Rupert.....	Repairs to wharf.
Triple island.....	Erection of a reinforced concrete tower, fog alarm building and dwelling combined. Work started this year.
Victoria agency.....	Extension to storage shed and completion of the interior of same.



COMMISSIONER OF LIGHTS' BRANCH.

REPORT OF J. G. MACPHAIL, B.A., B.Sc., COMMISSIONER OF LIGHTS.

The principal work performed during the fiscal year ended March 31, 1920, has been an extension of the buoy and beacon services, together with the maintenance of lights and other aids to navigation throughout the Dominion, and the maintenance and inspection of public wharves. The operations of this branch are set forth in tabular form in two inclosures.

INCLOSURE No. 1.—Statement by districts, showing the number of lights of the several orders, lightships, lightboats, lightkeepers, fog signals, buoys, submarine bells, etc.

	1st order lights.	2nd order lights.	3rd order lights.	4th order lights.	5th order lights.	6th order lights.	7th order lights.	Gas beacons.	Pressed lens lights & other minor types.	Catoptric lights.	Electric lights.	Total.	Lightships.	Lightboats.	Lightkeepers.	Diaphones.	Fog guns and bombs.	Fog horns and trumpets.
New Brunswick.....		4	3	24	20	26	59	1	10	12	8	167	1	1	162	24	1	1
Nova Scotia.....	3	3	7	32	16	20	40		15	44	3	186	2		171	17	1	
Prince Edward Island.....	2	6	9	33	5	11	39		10	10	62	223			156	12	1	
Quebec.....	3	1	11	20	11	17	44	6	20	78	15	235	4		187	20	4	
Hudson bay and strait.....								10				10						
Montreal.....					7	7	19	5	26	157	7	235			159			
Prescott.....			3	14	5	6	19	19	5	9	2	82			45	10		
Parry Sound.....		5	10	23	14	12	53	30	32	61	21	261	2		145	24		
Kenora.....							3		2	2	2	9			6			
Manitoba.....				2	3		4		1	3	1	16			10			
Victoria.....	3	1	3	8	7	2	13	42	8	4	18	109	1		66	19		
Prince Rupert.....	1		2	3	1		3	29	2	3		44			13	5		
Total.....	12	20	49	166	89	101	296	142	131	491	81	1,578	10	1	1,120	131	7	1

	Fog whistles.	Sirens.	Fog bells.	Hand fog horns.	Hand fog bells.	Total fog signals.	Fog signal stations only.	Gas buoys.	Gas and whist- ling buoys.	Gas and bell buoys.	Whistling buoys.	Bell buoys.	Submarine bell buoys.	Total gas and signal buoys.	Lightship sub- marine bells.	Total sub- marine bells.	Lighted spar buoys, floats, and dolphins.	Unlighted buoys.	Stakes, bushes and palises.	Unlighted dot- phins, spindles and beacons.
New Brunswick..	1		9	22		58	7	3	13	2	8	27		53	1	1		570	432	65
Nova Scotia.....	1		2	45		66	2	5	20	6	16	44	3	97	1	4		1,009	12	13
Prince Edward I.		1		9		23		4	4	3	3	11		27				223	1,555	6
Quebec.....	5			23	4	56	1	61		8		1	2	72	3	5	1	279	140	41
Hudson bay a. str.																				
Montreal.....								99						99			61	526	180	198
Prescott.....			3	5		18		37		1		1		39			1	532		4
Parry Sound.....	2		4	31		61		35	4	9		2		50	1	1	28	558	39	56
Kenora.....																		392		
Manitoba.....				4		4												35		
Victoria.....			11	5		35	1	1	4	3	2	3		13	1	1	16	162		87
Prince Rupert....			3	5		13	2	2	7	2				11				33		25
Total.....	9	1	32	149	4	334	13	247	52	37	31	89	5	461	7	12	107	4,979	2,358	495



## SESSIONAL PAPER No. 21

INCLOSURE No. 2.—Statement, by localities, giving the number of unlighted buoys, stakes, bushes, balises, dolphins, spindles and beacons maintained throughout the Dominion during the fiscal year ended March 31, 1920.

## NEW BRUNSWICK DISTRICT.

Locality and number of stakes, bushes, etc.	No. of buoys.	Locality and number of stakes, bushes, etc.	No. of buoys.
Advocate harbour, N.S.....	8	Lorneville, N.B.....	1
Alma, Little Salmon river, N.B.....	3	Magaguadavic, N.B.....	13
Amherst basin approaches, N.S.....	4	Man'O'War rock, L'Etang harbour, N.B.....	2
Apple river, N.S.....	8	Maquapit and French lakes, N.B., 57 stakes.....	13
Argyle river and sound, N.S.....	10	Mink island, L'Etang harbour, N.B.....	1
Avon river, N.S.....	4	Musquash, N.B.....	7
Bear river, N.S.....	7	Old Man rock, N.S.....	1
Beaver harbour, N.B.....	4	Old Woman rock, N.S.....	1
Big Duck island, Grand Manan.....	1	Owls head, N.S.....	1
Blacks harbour, N.B.....	3	Ox nead ledges, N.B.....	3
Bliss island, N.B.....	1	Parrsboro, N.S.....	6
Buck rock, Grand Manan.....	1	Pea point, L'Etang harbour, N.B.....	1
Calf island bay, N.S.....	5	Pease island, N.S.....	1
Campobello, N.B.....	10	Petitcodiac river.....	12
Chambers rock, N.B.....	1	Pubnico, N.S.....	21
Chamcook harbour entrance, N.B.....	1	Quaco, N.B.....	1
Chance harbour, N.B.....	2	Roaring Bull rock, N.S.....	1
Chebogue, N.S.....	1	Robinson's ball station, Wood harbour, N.S.....	2
Clark harbour, N.S.....	18	St. Andrews, N.B., 2 beacons, 3 stakes.....	17
Cockerwitt pass and Woods Harbour, N.S., 1 spindle.....	18	St. Croix, N.B.....	8
Cumberland basin, N.S.....	2	St. John Harbour, N.B.....	3
Deadman's head, L'Etang harbour, N.B.....	1	St. John river, N.B., 150 stakes.....	84
Digby and Annapolis, N.S.....	17	Salmon river, N.B., bushing.....	15
Digdequash, N.B.....	6	Schooner rock, N.S.....	1
Dipper harbour, N.B.....	5	Scotchtown, N.B.....	6
Dochet island, St. Croix river.....	1	Shag harbour, N.S.....	17
Freeport, N.S., 1 beacon.....	3	Shampiers wharf, N.B., 15 stakes.....	2
Goose bay, N.S., 35 stakes.....	8	Shulee, N.S.....	8
Grand lake, N.B., bushes.....	32	Stay point, Lepreau river.....	1
Grand Manan, bay of Fundy, 13 spindles, 1 beacon.....	17	Tusket river, N.S.....	9
Grand passage, N.S., 2 spindles.....	5	Tusket Wedge, N.S., 3 spindles.....	17
Grassy island, St. John river, 18 stakes.....	7	Tynemouth creek, N.B.....	4
Gull ledges, N.S.....	1	Walton harbour, N.S.....	1
Hatfield point, St. John river, bushes.....	1	Washadamoak lake, N.B., 144 bushes.....	2
Indian point bar channel, Grand lake, 10 stakes....	3	Waweig river, N.B.....	2
Johns ledge, N.S.....	1	West isles, N.B., 4 spindles.....	23
Letite, L'Etang and Bliss harbour, N.B.....	14	Weymouth, N.S.....	20
		Yarmouth, N.S., 33 dolphins.....	7

## NOVA SCOTIA DISTRICT.

Arichat, West Arichat and Janvrin, C.B.....	19	Guysborough, N.S.....	5
Barrington, N.S., 11 dolphins.....	44	Habitants bay, C.B.....	4
Beaver harbour, N.S.....	9	Halifax, N.S.....	20
Beaver island, Nova Scotia, southeast coast.....	1	Harrigan cove, N.S.....	3
Beaver narrows, C.B.....	2	Hautfond shoal, off cape Hogan, C.B.....	1
Big Lorraine (Lorembec harbour), C.B.....	3	Indian harbour, N.S.....	4
Birchtown, N.S.....	5	Ingonish, South Bay, C.B.....	9
Black rock shoal, off Dover, N.S.....	1	Isaac harbour, N.S., 9 winter buoys.....	13
Blandford, N.S.....	5	Janvrin shoal, entrance to Strait of Canso.....	1
Boulaceet, Gillies point, C.B.....	1	Jeddore, N.S., winter buoys.....	11
Bull rock, off cape Mocodome, 1 winter spar.....		Johnson harbour, C.B.....	5
Canso and St. Andrews passage, N.S., 20 winter buoys.....	30	Ketch harbour, N.S.....	6
Canso harbour entrance, N.S., 1 winter spar.....	3	Kieley cove, Blind bay, N.S.....	4
Cape Negro and Northeast harbour, N.S.....	17	Lahave, N.S.....	9
Chester and Gold river, N.S.....	28	Lahave river, N.S.....	6
Chezzetcook and Petpeswick, N.S.....	10	L'Ardoise, C.B.....	5
Christmas island and Barra strait, C.B.....	11	Larry river, N.S., 7 stakes.....	3
Clyde river, N.S.....	5	Liscomb, N.S., winter spars.....	7
Coddle harbour, N.S.....	5	Little Bras d'Or harbour, C.B.....	12
Cooks cove (Toby cove), N.S.....	4	Little Dover, N.S.....	9
Country Harbour, N.S.....	1	Little Liscomb harbour, N.S.....	4
Crow harbour, N.S.....	3	Little Lorembec (Little Lorraine), C.B.....	5
Denny river, C.B.....	3	Little narrows, C.B.....	10
Descousse and Lennox passage, C.B., 5 winter buoys	29	Liverpool, N.S.....	10
Devereaux shoal, off Betty island, N.S.....	1	Lockeport, N.S.....	14
Dover, N.S.....	7	Louisburg, C.B., 6 winter buoys.....	8
East Bay, Bras d'Or, C.B.....	5	Lunenburg, N.S.....	8
East Dover, N.S.....	3	Lunenburg, back cove, N.S.....	9
Eskasoni, C.B.....	6	Lunenburg, middle south, N.S., 7 winter buoys....	16
Fourchu harbour, C.B.....	15	Mahone bay, N.S., 1 beacon.....	12
Gannet shoal, entrance to Dover harbour, N.S.....	1	Main a dieu, C.B.....	5
Gegoggin, N.S.....	7	Marble mountain, C.B.....	5
Glace Bay, C.B.....	6	Marie Joseph and Ecum Secum, N.S., 11 winter buoys.....	16
Great Bras d'Or, C.B.....	7	Martins brook, N.S.....	5



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## INCLOSURE No. 2.—Statement, by localities, of unlighted buoys, etc.—Continued.

## NOVA SCOTIA DISTRICT—Concluded.

Locality and number of stakes, bushes, etc.	No. of Buoys.	Locality and number of stakes, bushes, etc.	No. of Buoys.
McKinnon harbour, C.B. . . . .	6	St. Mary river to Sherbrooke, N.S. . . . .	18
McNab cove, C.B. . . . .	2	St. Peter bay, C.B., 4 winter buoys. . . . .	16
McVarish shoal and Campbell point, Bras d'Or, C.B. . . . .	4	St. Peter inlet, C.B. . . . .	12
Middle ledge or South Easter, entrance to Country harbour, 1 winter spar. . . . .	1	Sambro, N.S. . . . .	29
Monsiller passage, C.B., 4 stakes. . . . .	6	Sand point, entrance to Strait of Canso. . . . .	1
Musquodoboit, N.S. . . . .	15	Shad Bay, N.S. . . . .	4
New harbour, N.S., 1 winter spar. . . . .	1	Shag bay, N.S. . . . .	8
Orangedale, C.B. . . . .	3	Sheet harbour, N.S., 5 winter buoys. . . . .	9
Orpheus, off Green island, N.S. . . . .	1	Shelburne, N.S., 3 winter spars. . . . .	9
Pennant harbour, N.S. . . . .	11	Ship harbour, lower, N.S., 6 winter buoys. . . . .	11
Petitdegrat, C.B., 6 winter buoys. . . . .	18	Slaughenwhite ledge, Hubbard cove, N.S. . . . .	1
Petpeswick inlet, N.S. . . . .	1	Smith island, West bay, C.B. . . . .	1
Pollock shoal, off West Ironbound island, N.S. . . . .	1	Sober island to Ecum Secum, N.S. . . . .	22
Pope harbour, N.S. . . . .	4	Southwest Bull, off Whitehead island, N.S., 1 winter spar. . . . .	6
Port Bickerton, N.S., 3 winter buoys. . . . .	5	Spry Bay, N.S. . . . .	6
Port Felix, N.S., 1 staff. . . . .	11	Stoney island, Baddeck, C.B. . . . .	1
Port Latour, N.S., 1 spindle. . . . .	16	Strait of Canso, N.S. . . . .	1
Port L'Hebert, N.S. . . . .	13	Sydney harbour, C.B. . . . .	6
Port Medway, N.S. . . . .	6	Tancook island, N.S. . . . .	3
Port Morien, C.B. . . . .	1	Tangier, N.S. . . . .	7
Port Mouton, N.S. . . . .	9	Ternece Bay, N.S. . . . .	3
Pringle harbour, C.B. . . . .	6	Three Fathom Harbour, N.S. . . . .	5
Prospect, Lower, N.S. . . . .	10	Tor Bay, N.S. . . . .	21
Prospect, Upper, N.S. . . . .	3	Voglers Cove, N.S. . . . .	6
Ram rock, Jordan bay, N.S. . . . .	1	Walkerville, C.B. . . . .	3
River Bourgeois, C.B. . . . .	6	Washaback river, C.B. . . . .	7
Rose bay, lower, N.S. . . . .	6	West Bay, C. B. . . . .	5
Roseway, N.S. . . . .	5	West Chezzetcook, N.S. . . . .	7
St. Ann, C.B. . . . .	12	West Dublin, N.S. . . . .	12
St. Margaret bay, N.S. . . . .	6	Whitehaven, N.S., 5 winter buoys. . . . .	8
St. Mary river, N.S., winter buoys. . . . .	11	Whycocomagh, C.B. . . . .	4

## PRINCE EDWARD ISLAND DISTRICT.

Aldouane, N.B., 42 bushes. . . . .	5	Harbour au Bouche, N.S., 6 stakes. . . . .	4
Amherst harbour, Magdalen islands. . . . .	8	House Harbour, Magdalen islands. . . . .	11
Baie du Vin, Huckleberry gully and channel, N.B., 44 bushes. . . . .	18	Jourimain shoal, N.B. . . . .	2
Baie Verte and Port Elgin, N.B., 30 stakes. . . . .	6	Judique, C. B. . . . .	1
Bartibog and Black rivers, N.B., 12 bushes. . . . .	1	Kouchibouguac and Black Lands gully, N.B., 150 bushes. . . . .	15
Bay Fortune, P.E.I. . . . .	3	Little channel, P.E.I. . . . .	3
Beach Point, P.E.I. . . . .	3	Little Shemogue, N.B., 2 poles. . . . .	5
Belle River, P.E.I. . . . .	3	Mabou, C.B., stakes. . . . .	20
Black Brook, Miramichi River. . . . .	3	Malpeque and Darnley, P.E.I., 2 stakes. . . . .	23
Brae harbour, P.E.I. . . . .	5	Margaree harbour, C.B., 7 stakes. . . . .	3
Brudenell river, P.E.I. . . . .	5	Merigomish, N.S. . . . .	6
Brule, N.S. . . . .	9	Miminegash, P.E.I. . . . .	6
Buctouche, N.B., 34 stakes. . . . .	22	Miramichi bay and river, 12 bushes, 12 winter spars. . . . .	38
Buctouche river, N.B., 260 bushes. . . . .	1	Miramichi bay, Grandoon channel. . . . .	20
Cape Jack ledges, N.S. . . . .	7	Miramichi river, northwest branch. . . . .	14
Cardigan, Lower, P.E.I., 2 winter buoys. . . . .	20	Miramichi river, southwest branch. . . . .	9
Cardigan, Upper, P.E.I. . . . .	6	Miscouche, P.E.I. . . . .	1
Caribou, N.S. . . . .	15	Montague river, P.E.I., 10 stakes. . . . .	7
Cascumpeque, P.E.I., 14 stakes. . . . .	8	Murray Harbour and rivers, P.E.I., 25 stakes, 1 winter spar. . . . .	32
Charlottetown, P.E.I. . . . .	14	Napan river, N.B., 24 stakes. . . . .	3
Cheticamp, N.S. . . . .	3	Neguac, N.B. . . . .	19
Chimney Corner, C.B. . . . .	11	New London French river, P.E.I., '5 stakes. . . . .	8
Cocagne, N.B., 30 stakes. . . . .	3	Northport, N.S. . . . .	12
Covehead, P.E.I. . . . .	11	North river, P.E.I., 14 stakes. . . . .	3
Crapaud, P.E.I., stakes. . . . .	14	Orwell and Vernon rivers, P.E.I., 36 bushes, 4 beacons. . . . .	3
East river, P.E.I., 15 stakes, 8 bushes. . . . .	9	Pictou, N.S. . . . .	7
Egmont bay, north, P.E.I., 19 stakes. . . . .	3	Pinette, P.E.I., 24 bushes. . . . .	5
Egmont bay, south, P.E.I., 13 stakes. . . . .	6	Pokemouche, N.B., bushes. . . . .	6
Entry island and Amherst island passage (Magdalen islands) . . . . .	19	Port Hill, P.E.I. . . . .	12
Georgetown and St. Marys bay, P.E.I., 3 winter spars. . . . .	5	Port Hood, C.B., 2 winter buoys. . . . .	5
Goose and Palmer Harbours, P.E.I. . . . .	17	Pownall, P.E.I., 10 stakes. . . . .	9
Grand Entry, Magdalen islands. . . . .	4	Pugwash, N.S. . . . .	8
Grand Etang, C. B. . . . .	2	Richibucto, N.B. . . . .	38
Grandigue, N.B., 30 stakes, 20 bushes. . . . .	12	Richibucto river, Rexton & Browns yard, N.B. . . . .	30
Grand river (Boughton river), P.E.I., 72 bush stakes, 1 beacon. . . . .	8	Rifleman reef, P.E.I. . . . .	1
Grand river, off Cape Sixteen, Malpeque bay, P. E.I. . . . .	4	River John, N.S., stakes. . . . .	3
Grand Tracadie, P.E.I. . . . .	9	River Phillip, N.S. . . . .	6
Great Shemogue, N.B. . . . .	1	Rollo Bay, P.E.I. . . . .	3
Grindstone reef, Magdalen islands. . . . .		Rustico, P.E.I., 30 stakes. . . . .	1
		St. Charles river, N.B., 60 bushes. . . . .	



## SESSIONAL PAPER No. 21

INCLOSURE No. 2.—Statement, by localities, of unlighted buoys, etc.—*Continued.*PRINCE EDWARD ISLAND DISTRICT—*Concluded.*

Locality and number of stakes, bushes, etc.	No. of Buoys.	Locality and number of stakes, bushes, etc.	No. of Buoys.
St. Louis, N.B., 70 bushes.....	9	Summerside, P.E.I., 10 stakes.....	10
St. Louis river, N.B., 54 bushes and stakes.....	.....	Tabusintac, N.B.....	20
St. Peter harbour, P.E.I., 6 stakes.....	5	Tatamagouche, N.S., 46 stakes.....	18
Sandy Hook, Magdalen islands.....	1	Tidnish, N.S., stakes.....	5
Savage harbour, P.E.I.....	2	Tracadie, north gully, N.B., 100 bushes.....	12
Shediac, N.B.....	19	Tracadie, south gully, N.B., 30 bushes.....	5
Shippigan, N.B., 27 pickets, 30 stakes, 1 beacon.....	27	Wallace, N.S., 33 stakes.....	11
Souris, P.E.I.....	4	West Point, P.E.I.....	4
Stanley and Bayfield channel, Southwest river, Clifton bridge, P.E.I., 14 stakes.....	9	West river, P.E.I., 65 stakes.....	8
		Wood Island, P.E.I.....	4

## QUEBEC DISTRICT.

Anse a Beaufils, P.Q.....	1	New Richmond, P.Q.....	3
Anse aux Gascons, P.Q.....	1	North channel, Orleans island, P.Q.....	13
Barachois de Malbaie, P.Q.....	1	Nouvelle roads, P.Q.....	2
Bathurst, N.B.....	31	Paspebiac, P.Q.....	1
Beaudry shoal, Gaspé basin, P.Q.....	1	Perce, P.Q.....	2
Beauport, P.Q.....	3	Petit Rocher, N.B.....	1
Bonaventure, P.Q.....	11	Point St. Peter, P.Q.....	1
Cap Chat, P.Q.....	1	Port Daniel, P.Q.....	1
Cape Cove, P.Q.....	1	Portneuf-en-Bas, P.Q.....	9
Cape d'Espoir, P.Q.....	1	Restigouche river and Chaleur bay.....	22
Caraquet, N.B.....	16	River St. Lawrence, 33 beacons, 8 spindles, 7 steel winter spar buoys.....	31
Caraquet to Mizonette, N.B.....	3	Ste. Anne river, P.Q.....	1
Carleton point, P.Q.....	1	St. Godfroy, P.Q.....	1
Echourie rock, Serpent reef, P.Q.....	1	St. Michel de Bellechasse, P.Q.....	4
Fox river, P.Q.....	1	St. Simon bay, N.B., 15 stakes.....	6
Grande Anse, N.B.....	4	St. Thomas de Montmagny, P.Q.....	8
Gros-cap-aux-Os, P.Q.....	1	Saguenay river, vicinity of Chicoutimi, P.Q.....	35
Lake St. John, Ashuapmouchouan river, 30 balises.....	7	Ottawa river district.....	85
Lake St. John, Mistassin river, 60 balises.....	12	Richelieu rapids, bushes.....	.....
Lake St. John, Peribonka river and Roberval, 35 balises.....	16	Richelieu river.....	65
Little River East, P.Q.....	1	Rideau river, 70 unlighted floats.....	.....
Little River West, P.Q.....	1	River St. Lawrence, 10 balises.....	291
Little Shippigan (Miscou gully), N.B.....	4	Riviere des Prairies, P.Q.....	11
Maria, P.Q.....	2	St. Francis river, P.Q., 80 balises, 12 day beacons.....	.....
Matane, P.Q.....	2	St. Maurice river, Grandes Piles to Latuque, P.Q., 106 day beacons.....	74
Miscou, N.B.....	8	Yamachiche river, P.Q., 30 balises, 4 day beacons.....	.....
Moise river, P.Q.....	2	Yamaska river, P.Q., 60 balises, 6 day beacons.....	.....
Natashkwan, P.Q.....	4		

## PRESCOTT DISTRICT.

Bay of Quinte.....	15	Murray canal and Presqu'île bay.....	19
Kingston.....	9	Napanee river.....	14
Lake Ontario, Melville shoal.....	1	Picton harbour.....	6
Lake Ontario, N.E. of Snake island.....	1	River St. Lawrence, 4 beacons.....	91
Lake Ontario, S.E. end of Snake island shoal.....	1	Telegraph narrows.....	8
Lake Ontario, S.W. end Snake island shoal.....	1	Trent canal (maintained for this Department by Department of Railways and Canals.....	317
Lake Ontario, off Long point, Wolfe island.....	1	Trenton.....	13
Lake Ontario, E. of Presqu'île light.....	1	Whitby.....	5
Lake St. Francis.....	29		

## PARRY SOUND DISTRICT.

Ann Long bank, Georgian bay.....	1	Dawson rock, Georgian bay.....	1
Bar point, Georgian bay.....	1	Detroit river.....	30
Bad Neighbour shoal, Georgian bay entrance.....	1	Fitzroy Harbour, Ont.....	14
Bernard rock, Georgian bay.....	1	Fort William, lake Superior.....	15
Blind River, North channel, lake Huron.....	6	Goderich, lake Huron.....	7
Burke shoal, lake Superior.....	1	Jackson shoal, Georgian bay.....	2
Byng inlet channel, Georgian bay, 6 beacons.....	27	Kennedy bank, Georgian bay.....	1
Cache Bay, lake Nipissing, 8 stakes.....	11	Key Harbour, Georgian bay, 6 beacons.....	24
Campana shoal, Georgian bay.....	1	Killarney harbour, Georgian bay.....	3
Campbell rock, Georgian bay.....	1	Lake Couchiching and narrows, 11 bushes.....	8
Cape Hurd, lake Huron.....	3	Lake Simcoe.....	5
Clapperton channel, North channel, lake Huron, beacon.....	1	Lake Superior, southeastern part.....	7
Cloud Bay, lake Superior.....	2	Lionshead harbour, Georgian bay.....	1
Collingwood, Georgian bay.....	13	Little Current, North channel, lake Huron.....	27
		Mary Ward ledges, Georgian bay.....	3



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INCLOSURE No. 2.—Statement, by localities, of unlighted buoys, etc.—*Concluded.*PARRY SOUND DISTRICT—*Concluded.*

Locality and number of stakes, bushes, etc.	No. of Buoys.	Locality and number of stakes, bushes, etc.	No. of Buoys.
Meaford harbour, Georgian bay.....	3	River St. Clair, middleground.....	1
Michipicooten island (Quebec harbour) lake Superior.....	6	River St. Mary and southeastern part of lake Superior.....	32
Midland and Victoria Harbours, Georgian bay..	5	River Thames, lake St. Clair.....	7
Morden rock, Georgian bay.....	1	Rondeau, lake Erie.....	6
Mutton island, lake Superior.....	1	St. Joseph channel, lake Huron, 1 beacon, 5 winter buoys.....	25
Northeast shingle, Georgian bay.....	1	Shebeshekong channel, Georgian bay, 22 day beacons.....	
Ottawa river, above Pembroke, Ont.....	30	Silver islet, lake Superior.....	2
Owen Sound channel, Georgian bay.....	4	Southampton, lake Huron.....	7
Parry Sound ship channel, 2 beacons.....	20	South Baymouth, lake Huron.....	4
Parry Sound to Penetang, inner channel, Georgian bay.....	63	Stokes bay, lake Huron.....	6
Pointe au Baril and Kennedy shoal, Georgian bay, 15 beacons.....	3	Sturgeon river, 20 stakes.....	5
Point Pelee, lake Erie.....	2	Victoria island, lake Superior.....	3
Port Arthur, lake Superior.....	21	Waubauskene.....	53
Port McNicholl, Georgian bay.....	2	Wabuno channel, Georgian bay, 3 beacons.....	5
Port Rowan, lake Erie.....	10	Wingfield Basin, Georgian bay.....	4
River St. Clair, chenel Ecarte.....	1		

## KENORA DISTRICT.

Lake of the Woods.....	270	Wabigoon lake.....	27
Rainy lake and Rainy river.....	58	Winnipeg river, White Dog to Kenora ..	20
Shoal lake.....	17		

## MANITOBA DISTRICT.

Black river, lake Winnipeg.....	6	Warrens landing, lake Winnipeg.....	12
Red river.....	17		

## VICTORIA DISTRICT.

Active pass, 1 beacon.....		Malaspina strait, 4 beacons.....	1
Alberni canal, 1 pile dolphin.....		Mist rock, west coast Vancouver island, 1 day beacon.....	
Arrow lakes.....	16	Mud bay, Serpentine and Nicomeck's rivers, 3 beacons, 27 dolphins.....	13
Barkley sound, 1 beacon.....	7	Nanaimo.....	
Baynes sound, 1 pile dolphin.....	1	Okissolla channel, 3 beacons.....	2
Berghs cove, Quatsino arm.....	1	Pender island channel.....	9
Broughton strait.....	1	Pitt river.....	1
Bull rock, west coast Vancouver island, 1 beacon		Porlier pass.....	1
Burrard inlet, 1 beacon.....	4	Prevost channel.....	1
Clayoquot bar, Clayoquot.....	4	Saanich arm.....	1
Clayoquot sound, 3 beacons.....	9	Saanich inlet, 1 spindle, 3 beacons.....	
Colburne passage, Colburne channel.....	2	Satellite channel, 1 beacon.....	1
Courtenay river, 12 pile dolphins.....		Shushartie bay, 1 day beacon.....	
Discovery passage.....	1	Shute passage.....	1
Esquimault harbour, 1 beacon.....	4	Sidney channel, 1 beacon.....	6
Fraser river.....	35	Stuart channel, 4 beacons, 1 pile dolphin.....	6
Ganges harbour.....	2	Sutil channel, 1 pile dolphin.....	2
Georgia strait, 2 beacons, range day marks.....	14	Trincomali channel, 3 beacons.....	3
Haro strait, 1 beacon.....	2	Ucluelet harbour.....	1
Johnstone strait, 4 beacons.....	1	Victoria harbour, 2 beacons.....	2
Juan de Fuca strait .....	1		
Kokshittle arm, Kyuquot arm.....	1		
Kootenay lake, northwest arm.....	7		

## PRINCE RUPERT DISTRICT.

Chatham sound, 1 beacon.....	5	Porpoise harbour.....	6
Finlayson channel, Grenville channel and connecting waters, 4 beacons.....	1	Prince Rupert harbour, 1 beacon.....	2
Fisher channel, Lama passage and Seaforth channel, 6 beacons.....	1	Prince Rupert harbour, (Venn passage).....	5
Metlakatla harbour.....	4	Queen Charlotte islands, 4 beacons.....	1
Observatory inlet, 3 beacons.....	3	Queen Charlotte sound and connecting waters, 1 beacon.....	
		Skeena river and passages, 5 beacons.....	2



## RIVER ST. LAWRENCE SHIP CHANNEL.

REPORT OF V. W. FORNERET, B.A. SC., SUPERINTENDING ENGINEER.

## GENERAL INFORMATION.

The ship channel of the river St. Lawrence between Montreal and Father Point, has a total length of 340 statute miles.

The contracted part of the river, which may be properly called "Ship Channel" commences at "The Traverse" (South channel) to which point from Montreal, the distance is 220 miles. This is divided into five divisions as follows:—

Division 1—Montreal to Sorel.....	45 statute miles.
" 2—Sorel to Batiscan (does not include lake St. Peter).....	36 "
" 3—Lake St. Peter.....	20 "
" 4—Batiscan to Quebec.....	59 "
" 5—Quebec to The Traverse.....	60 "
Total.....	220 "

The dredging operations for the season of 1919 were again very limited, owing to existing conditions, and as in the previous season, only day crews were placed on the dredges. This naturally made a great difference with the results obtained during the season as compared with other seasons, when the operations were carried on day and night, and a larger number of vessels in commission.

## DREDGING OPERATIONS DURING SEASON 1919.

*Division 1—Montreal to Sorel.*

*Longueuil Curve (Montreal Harbour).*—Some work was done on this curve during the season of 1919. One dredge worked for a short time at the commencement of the season and another at the end.

The dredging consisted of widening the curve on the north side to a width of 850 feet, and deepening the channel to 35 feet at E.L.W. of 1897. The material being hardpan, stones, boulders and some shale rock.

The total number of cubic yards removed amounted to 52,295.

*Varennnes Curve.*—One dredge worked for a short time in the spring, on Varennnes curve, deepening the channel to 35 feet at E.L.W. of 1897. The material dredged consisted of clay.

The number of cubic yards removed amounted to 53,200.

*Vercheres Traverse.*—Considerable work was done on Vercheres traverse, in connection with the deepening of the channel to 35 feet at E.L.W. of 1897. One dredge was kept at work nearly all season and good progress was made, there remaining very little to be done to complete the 35 dredging on this part of the channel.

The number of cubic yards removed amounted to 164,750, the material consisting of clay.

*Division II.—Sorel to Batiscan.*

*Champlain Channel.*—This channel was thoroughly swept for 30 feet at E.L.W., by the sweeping steamer early in the season, and sand bars were found to have again formed between Pointe Citrouille and the lower half of Champlain channel.

One dredge was detailed for this special work, and was occupied removing these bars most of the season.



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This is the only point in the ship channel between Montreal and Quebec, where filling in of any importance occurs.

The number of cubic yards removed amounted to 55,800.

*Division III.—Lake (St. Peter).*

No work was done in this Division during the season of 1919.

*Division IV.—Batiscan to Quebec.*

*Cap à la Roche Curve.*—Considerable work was accomplished at Cap à la Roche, where the widening on the north side of the channel (upper part of the curve) was completed.

This now gives a width of 500 to 550 feet instead of 300 to 400 as formerly.

This widening was also deepened to 30 feet at extreme low water of 1897, which is  $4\frac{1}{2}$  feet more than  $27\frac{1}{2}$  feet at ordinary low water, the present depth available in the Cap à la Roche channel.

On account of the uncompleted south half of the channel to 30 feet at E.L.W., it could only be opened to  $27\frac{1}{2}$  feet at O.L.W.

In order to give the vessels the full advantage of the increased width as soon as possible, at this point, the widened part was thoroughly swept to  $27\frac{1}{2}$  feet at ordinary low water and found clear for that depth.

The buoying of this channel was then rearranged to make this part of the river safe for day and night navigation. Three new gas bouys were added and the existing can and conical steel buoys shifted to more satisfactory positions. This improvement now permits the largest vessels coming to Montreal to navigate this part of the ship channel, day and night with safety.

Some deepening was also done to 30 feet at E.L.W. on the south half of the Cap à la Roche channel, which work is well advanced.

The total number of cubic yards removed during the season of 1919 amounted to 88,655. In addition to this there is quite a large area broken up by the rock cutter in readiness for the dredges to remove next season.

*Division V—Quebec to The Traverse.*

Hydraulic Dredge No. 8 (Beaujeu) was occupied all season removing the filling that had occurred in the south channel (St. Thomas bank). The material was soft clay (silt) and the number of cubic yards dredged amounted to 131,900.

The total number of cubic yards dredged in the river St. Lawrence ship channel, above and below Quebec, amounted to 517,305 during season of 1919.

*Thirty-foot Project (end of season 1919).*

Total length of dredging .....	66.42 Miles.
“ “ yet to be done.....	1.58 “
Total number of cubic yards dredged.....	53,169,332
“ “ yet to be dredged.....	2,132,000

*Thirty-five-foot Project (end of season 1919).*

Total length of dredging done.....	40.99 Miles
“ “ yet to be done.....	49.39 “
Total number of cubic yards dredged.....	37,903,601
“ “ yet to be dredged.....	29,170,340

The total cost from 1851 to the end of the fiscal year, March 31, 1920, of the ship channel from Montreal to Father Point, including plant, shops, surveys, etc., is as follows:—

Dredging.....	\$14,940,174 10
Plant, Shops, Surveys, etc.....	8,320,167 64
Total.....	\$23,260,341 74



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The total number of cubic yards removed from 1851, to the end of season of 1919, amounted to 117,453,139, the material varying from very hard shale rock to soft blue clay.

## TIDAL SEMAPHORES.

The tidal semaphore at Cap à la Roche, which shows the available depth of water in the dredged channel, was put in operation on April 24, 1919. The tidal semaphore at Pointe Citrouille, which also shows the depth available in Cap à la Roche channel, was put in operation the same day.

The semaphore at Pointe Citrouille is of great service to the pilots of deep-draught vessels outward bound, as it enables them to know if there is sufficient water in the channel at Cap à la Roche to allow them to proceed down in safety. If not, they can anchor at the splendid anchorage ground provided for them, just below Pointe Citrouille, where they can wait for the tide to rise.

The tidal semaphore at St. Nicholas which shows the available depth of water over the undredged St. Augustin channel, was put in operation on April 26, 1919.

## DEPTH OF WATER IN SHIP CHANNEL SEASON 1919.

With the exception of a few days at the beginning of the month of September, when the lowest water was 31 feet 3 inches in the 30-foot channel, which is considered good, the height of water kept high all season as can be noted by the following monthly averages during the season of navigation.

May	June	July	Aug.	Sept.	Oct.	Nov.
39' 7"	36' 7"	33' 5"	32' 4"	32' 3"	32' 8"	33' 5"

## ACCIDENTS.

The season of 1919 was practically free from any serious accidents or marine casualties in the ship channel, though it was a record for the number of vessels using it, and none could be attributed to any fault of the channel.

## SWEEPING OF THE SHIP CHANNEL.

The channel was thoroughly swept as usual during the season, two outfits being employed, but no obstruction of a serious nature was found. Some sand bars were found to have again formed in Champlain channel, but these were dredged before the low water season. Considerable sweeping was also done below Quebec by the sweeping steamer *Detector* in the North and South channels. Some filling in was found to have occurred in the South channel at St. Thomas flats, and a dredge was occupied all season removing this.

## ACCIDENTS SEASON 1919.

*Between Montreal and Quebec.*

May 1.—SS. *War Toronto* went ashore at the lower end of Ile Hartelle. Was floated by dredging, apparently not damaged.

August 6.—SS. *Lake Frelona* from Great Lakes eastbound, grounded on Pointe du Chene, opposite Grondines. Was refloated—slight damage.

October 22.—Tug *J. H. Hackett* in collision with White Star Dom. SS. *Rimouski* two miles below St. Augustin bar. Tug suffered considerable damage.

October 26.—SS. *Trewillard* eastbound from Montreal went ashore 3 miles above Batiscan during foggy weather. Was refloated.

November 28.—SS. *Bassa* while turning in Montreal harbour went aground outside of Channel, a short distance above Tarte pier. Was lightered and pulled off.



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November 29.—American Destroyer *Eagle No. 58* outward bound went ashore on Ile Ste. Therese opposite Varennes, P.Q.. Was refloated no damage.

December 9.—SS. *Canadian Volunteer*, of the Canadian Mercantile Marine, touched on shoal outside of channel at Cap à la Roche. Bottom considerably damaged.

December 9.—SS. *Lake Elsmere* belonging to the American Shipping Board in tow of tugs *Lord Strathcona* and *Andree Dupre* struck the superstructure of the Quebec bridge on the North side. The vessel suffered considerable damage to her masts. Accident caused by heavy ice pack.

*Between Quebec and Father Point.*

May 21.—C.P.O.S. *War Beryl*, outward bound collided with Dredge No. 8 belonging to the Department of Marine, anchored in St. Thomas channel. Both vessels damaged.

June 2.—Schooner *O. Caron* of Limoilou Quebec was struck by a steamer outward bound off St. Siméon and badly damaged.

June 16.—Steam barge *Rockferry* struck bottom East of Cape Dogs when outward bound. Vessel leaking badly.

June 27.—SS. *Corcoran* belonging to the U.S. Shipping Board collided with Market Boat *Champion*, both outward bound. Both ships were damaged. The accident occurred off the upper part of Island of Orleans.

December 17.—SS. *Canadian Recruit* of the Canadian Mercantile Marine, outward bound was driven ashore by the ice on St. Anne shoals. She floated off at high tide but owing to damaged rudder drifted in the ice pack as far as Pointe Vache, at the entrance of the Saguenay river, where the vessel was shoved ashore by the ice at that point. Salvaging operations are now going on.

None of the above casualties can be attributed to any fault of the ship channel.

MARINE SIGNAL-SERVICE.

Signal stations have been established for the purpose of maintaining communication between ship and shore by means of flag signals.

This system of stations extends from St. John, N.B., Halifax, N.S., Cape Race, Nfld., and Belle Isle up the gulf and river St. Lawrence and through the Great Lakes to Sault Ste. Marie, Ont.

Following is a complete list of stations:—

EAST OF QUEBEC.

Name of Station.	Location.	Nautical miles from Quebec.	Means of communication.
R. Quebec.....	Custom House .....	0	Telephone.
X St. Jean d'Orleans.....	Shore end of wharf.....	14	"
Crane Island.....	Lighthouse.....	32	"
L'Islet.....	100 yards east of church.....	40	Telegraph.
Cape Salmon.....	Lighthouse.....	81	Telephone and telegraph.
Riviere du Loup.....	Shore end of wharf.....	92	Telegraph.
Father Point.....	Shore end of wharf .....	157	"
Little Metis.....	Lighthouse.....	175	"
Marane.....	".....	200	"
Pointe des Monts.....	".....	219	"
Cap Chat.....	".....	234	"
Riviere a la Martre.....	".....	260	"
Capé Mardalen .....	".....	294	"
Fame Point.....	".....	325	"
Cap des Rosiers.....	".....	349	"
Cap d'Espoir.....	".....	377	"
Point Maquereau.....	".....	400	"
West Point, Anticosti.....	".....	332	"
South West Point, Anticosti.....	".....	360	"
South Point, Anticosti.....	".....	415	"
Heath Point, Anticosti.....	".....	438	"
Point Escuminac, N.B.....	".....	462	"
Amherst Island, Magdalen Islands.....	".....	481	"



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## EAST OF QUEBEC—Concluded.

Station.	Location.	Nautical miles from Quebec.	Means of communication.
St. Paul's Island, C.B.....	Main Station.....	540	Telephone.
Money Point, C.B., N.S.....	Lighthouse.....	537	"
Flat Point, N.S.....	".....	575	Telegraph.
Cape Ray, Nfld.....	".....	553	"
Cape Race, Nfld....	".....	826	"
Point Amour, Labrador.....	".....	673	Wireless telegraph.
Belle Isle.....	".....	734	"
Camperdown, N.S. ....	Near Wireless station.....		Telephone.
Halifax, N.S.....	The Citadel.....		"
Brier Island, N.S.....	Near Lighthouse.....		"
Point Lepreaux, N.B.....	Lighthouse.....		"
Partridge Island, N.B.....	".....		"
St. John, N.B.....	Custom House.....		"
Point Tupper.....			Telegraph.
Seatari Island, C.B.....			"

## WEST OF QUEBEC.

Bridge Station.....	$\frac{1}{2}$ mile above Quebec Bridge on south shore.....	6	Telephone.
St. Nicholas.....	At Tidal Semaphore.....	12	"
Portneuf.....	In front Lighthouse.....	31	"
Grondines.....	In old windmill tower.....	41	"
St. Jean Deschaillons.....	At tidal semaphore.....	45	"
Pointe Citrouille.....	In lighthouse.....	55	"
Three Rivers.....	Upper end of Bureau wharf....	68	"
Sorel.....	Lower end of Government wharf.....	100	"
Bellmouth.....	About 500 feet east Contrecoeur Course, Low Light.....	110	"
Cap St. Michel—.....	Abreast east end Ile des Lauriers.....	125	"
Longue Pointe.....	Point between wharves.....	134	"
R. Montreal.....	92 Notre Dame St. East (La Sauvegarde Bldg.).....	139	"

## WEST OF MONTREAL.

R Lachine Canal.....	Lock No. 2.....	0	Telephone.
R Lachine Canal.....	Lachine.....	8	"
R Soulanges Canal.....	Cascades Point.....	21	"
R Soulanges Canal.....	Coteau Landing.....	33	"
R Cornwall Canal.....	Cornwall.....	62	"
R Galops Canal.....	Lift Lock.....	99	Telegraph.
R Welland Canal.....	Port Dalhousie.....	298	"
R Welland Canal.....	Port Colborne.....	321	"
R Soo Canal.....	Sault Ste-Marie.....	820	"

Stations marked thus "R" are reporting stations only and are not equipped for signalling purposes. Stations marked "X" are closed temporarily.

## BRIEF SUMMARY OF WORK PERFORMED.

1. Stations report movements of vessels to Montreal, Quebec, Sydney, Halifax or St. John.

2. Stations report weather conditions daily to Montreal, Quebec, Sydney, Halifax or St. John.

3. Montreal, Quebec and St. John publish daily bulletins giving weather and ice conditions and movements of vessels.

4. Montreal and Quebec publish daily bulletins showing the depth of water at various points in the river St. Lawrence ship channel.

5. The Signal Service offices at Montreal, Quebec and St. John are opened day and night for the purpose of furnishing the public with information of shipping matters.

6. The telegraph system of the Department of Public Works on the north shore of the gulf of St. Lawrence, reports the movements of vessels engaged in the coasting trade in the Signal Service at Quebec.



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7. The collectors of customs at all the seaports in the river and gulf of St. Lawrence, on the Atlantic coast and in the Bay of Fundy report the arrival and departure of vessels engaged in the overseas trade.

8. Lloyd's agents at Quebec are furnished daily with full information of the movements of vessels engaged in the overseas trade to and from ports in the province of Quebec.

9. Lloyd's agents at St. John, N.B., are furnished daily with full information of the movements of vessels engaged in the overseas trade to and from ports in the Maritime Provinces.

#### IMPROVEMENTS CARRIED OUT AND CONTEMPLATED.

The Signal Service at Halifax, St. John, North Sydney and Quebec, in the river and gulf of St. Lawrence and on the Great Lakes, and the telephonic and reporting service between Quebec and Montreal were combined on April 1, 1914, under the heading of "Signal Service" with the headquarters at Quebec. This consolidation has greatly facilitated the work and has led to many improvements.

An arrangement was made with the Department of Railways and Canals whereby their officials at the Lachine, Soulanges, Cornwall, Galops, Welland and Sault Ste. Marie canals, report several times daily to the Signal Service at Montreal, giving movements of vessels bound to Montreal and points east of that port. This service has proved itself to be very useful, especially to the shipping interests of the port of Montreal, and will be extended from time to time as conditions may warrant.

#### ICE-BREAKING, 1919-20.

##### *Report of N. B. McLean, Resident Engineer.*

The weather conditions during the winter of 1919-20 were severe, the month of January being exceptionally so. The ice bridge formed at Port St. Francis December 18, and by December 21, the river was covered to Montreal. The ice jammed several times at Quebec bridge, but was successfully broken up by the *Lady Grey*. On January 24, the ice blocked at Portneuf, and on February 1 had backed up to Three Rivers, the river then being covered with ice from Portneuf to Montreal.

The *Lady Grey* was alone all winter to take care of the ice situation in the river above Quebec, as the *Montcalm* had been detailed for duty in the gulf, escorting ships that had been caught in the ice, relieving light keepers, and carrying supplies to the Magdalen Islands.

The absence of the *Montcalm* was a very severe drawback, placing a very heavy strain on the *Lady Grey*, delaying the work of opening the river above Quebec, and thus increasing the chances of very serious flooding. The water reached a height of 14 feet 9 inches above extreme low water at Three Rivers, which is practically flood level. Had the *Lady Grey* met with an accident and been put out of commission, very grave floods would have been the result.

The ice-breaking operations began on November 28, when the C.G.S. *Lady Grey* took up her station at Three Rivers to keep Port St. Francis open and to aid vessels coming down. She was assisted in this work by the C.G.S. *Bellechasse*. Vessels were passing out daily until December 14, when the last ship, the *Canadian Ranger*, left for Quebec escorted by the *Lady Grey*, reaching there late that afternoon.

On December 16, the *Canadian Recruit* and the *Canadian Spinner*, of the Canadian Government Merchant Marine, left Quebec outward bound. The same day the *Canadian Recruit* was reported aground on the Ste. Anne shoals.



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She was later lifted off by the tide, and then was adrift until December 20, when she went ashore at Vaches point, below the mouth of the Saguenay river, where she remained hard and fast. The crew was taken off by a schooner from Tadoussac. On December 18, the *Canadian Spinner* was reported adrift in the ice off Bic.

As soon as the *Canadian Recruit* was reported in distress the *Lady Grey* was detailed to go to her assistance, but owing to thick weather, snowstorms, and heavy ice, she was unable to proceed past Grosse Ile until December 27, although she made almost daily attempts. On December 27, she went down, stopping to take off a number of people at Grosse Ile, and reaching Murray Bay in the afternoon. She arrived at Tadoussac on the 28th, taking aboard the crew of the *Canadian Recruit*. The next day, the 29th, she came up, picking up the light-keepers from Red island and Brandy pots, and arriving at Murray Bay at noon. She remained there the next day on account of thick weather, getting back to Quebec on the 31st.

The *Canadian Spinner*, which was reported adrift in the ice on December 18 off Bic, was met by the *Montcalm* abreast of S.W. point, Anticosti, on January 7, having drifted with the ice from Bic to this point. Both vessels were in the ice several days longer, reaching Sydney only January 13. The *Spinner* was 28 days out from Québec when she arrived at Sydney, and had the *Montcalm* not been available to go to her assistance it is very unlikely that she would ever have reached any port.

From December 31 to March 1 the *Lady Grey* remained on her station at Quebec, engaged from time to time slicing Beauport and Cap Rouge battures, so that the channel could not become too contracted, and breaking up a number of jams that formed at Quebec bridge. When the ice blocked at Portneuf on January 24, the *Lady Grey* was not sent to break it up, this being considered unsafe, as the ice might have jammed behind her, cutting her off from her base. Had the *Montcalm* been at Quebec this would have been attempted.

On March 1 the *Lady Grey* left Quebec and proceeded to St. Croix, where she began the work of opening the channel in the upper river. Between March 1 and April 5, the river was opened from St. Croix to Grondines. The ice encountered was very heavy throughout. The usual accumulation of frazil ice, solid to the bottom, was met with at Portneuf bend. The work was greatly retarded owing to bad weather conditions, frequent trips to Quebec for coal, poor quality of coal, and an injury to the ship's plates, which had to be repaired on the Grid-iron at Levis.

From April 5 to 8, the ice from lake St. Peter to Grondines was shoving and passing out, and on April 9, the *Lady Grey* was able to come to Three Rivers.

On April 10 and 11 the *Lady Grey* worked at the foot of lake St. Peter keeping the ice moving there. On the 12th, the lake was clear and she proceeded up to the Sorel islands, where a jam was broken up. On the 13th she arrived at Sorel, and from that date to the 17th, was engaged between Pte. aux Trembles and lake St. Peter, breaking up jams and keeping the ice running. The ice above Sorel was remarkably heavy, so heavy in fact, that after passing down through the Sorel islands, it grounded on the flats at the head of lake St. Peter between Ile aux Raisins Traverse and Number 2 Curve, reblocking the channel. On April 18, the *Lady Grey* reached Montreal.

At the request of the Department of Railways and Canals the *Lady Grey* cleared a channel through the frazil ice to the lower end of the Soulanges canal at Cascades point. She left Montreal May 1, reached the upper end of lake St. Louis the same day, worked two days cutting her way to the canal entrance, and was back in Montreal May 3. This completed the ice-breaking operations for 1919-20.



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## DREDGES.

*Elevator Dredge No. 1. (Laval).*

This is the oldest dredge in the ship channel fleet. The hull is of wood, constructed in Ottawa in 1894. The buckets are made of cast steel for work in rock and other hard material.

During the winter of 1918-19 the dredge was thoroughly overhauled and put in good condition for the next season's work.

The details of the operations of this dredge for the fiscal year beginning April 1, 1919, were as follows:—

Dredge *No. 1* left Sorel May 5 and was taken up to Vercheres Traverse, where she was laid out to deepen the channel to 35 feet at L.W. 1897, the material to be excavated being clay. From May 5 to May 7 inclusive, repairs were made to buckets. Operations were begun May 8 and carried on until September 5.

On September 5, *No. 1* was taken up to Montreal, and laid out the next day to widen and deepen the channel at Longueuil shoal, dredging to a depth of 35 feet at L.W. 1897, the material being clay, stones, hardpan, shale rock and boulders. She continued working there until October 15, when she was taken down to Sorel and went into winter quarters.

In a total of 137 days, during which this dredge was at work, her machinery was in actual operation 78 per cent of the full working time.

The total number of cubic yards dredged amounted to 187,750 at a cost of \$79,789.61 or 42  $\frac{49}{100}$  cents per cubic yard.

*Elevator Dredge No. 2. (Laurier).*

The hull of this dredge is of wood, having been constructed at the Government Shipyard at Sorel, P.Q., in 1897. She is equipped with a set of cast steel buckets, especially designed for work in rock or other hard material.

During the winter of 1918-19, this dredge was thoroughly overhauled and put in good order for the next season's operations.

The details of the operation of this dredge for the fiscal year beginning April 1, 1919, were as follows:—

Dredge *No. 2* was brought up from Sorel on May 5 to Varennes curve, and the following day, May 6, was laid out to deepen and widen this curve to 35 feet E.L.W. 1897, the material to be excavated being clay. Work was carried on there until June 21.

On the latter date *No. 2* was brought into Sorel where she underwent some repairs to her boilers and on June 25, she was taken down to Champlain channel and set to work cleaning up some sand filling that had occurred there. She continued working in this channel until October 13, when she was brought back to Sorel for winter quarters.

In a total of 132 days during which this dredge was at work her machinery was in actual operation 71 per cent of the full working time.

The total number of cubic yards removed amounted to 109,000 at a cost of \$79,495.93 or 72  $\frac{93}{100}$  cents per cubic yard.

*Elevator Dredge No. 5. (Lafontaine).*

This dredge was constructed at the Government Shipyard at Sorel P.Q., and was completed in 1901. The hull is of wood. She is fitted out with cast steel buckets for working in rock or other hard material.

During the winter of 1918-19 a thorough overhauling was given to this dredge and she was put in good order for the next season's work.

The details of the operations of this dredge for the fiscal year beginning April 1, 1919, were as follows:—



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Dredge *No. 5* left Sorel May 5 arriving at Longueuil shoal Montreal the same day. She was laid out May 6, and began work May 7, widening and deepening the channel to 35 feet at E.L.W. 1897, the Material to be dredged being clay, stones, hardpan, shale rock and boulders. She continued working there until June 28.

On June 28, *No. 5*, was brought down to Sorel, remaining there undergoing some repairs until July 2, when she was taken to Cap à la Roche curve, where she was laid out to deepen and widen the channel to 30 feet at E.L.W. 1897, the material to be excavated being shale rock. Operations were carried on there until October 13, when this dredge left for Sorel, arriving there October 14, and going into winter quarters.

In a total of 135 days during which this dredge was at work, her machinery was in actual operation 60 per cent of the full working time.

The total number of cubic yards removed amounted to 88,655, at a cost of \$106,332.17 or  $\$1.19\frac{93}{100}$  cents per cubic yard.

*Hopper Hydraulic Dredge No. 8. (Beaujeu)—Steel Hull, Twin Screw.*

Dredge *No. 8* was constructed at the Government Shipyard at Sorel, Que. in 1907.

During the winter of 1918-19, the dredge was given a thorough overhauling and put in good working order for the next season's operations.

*No. 8* left Sorel April 24, and arrived in Quebec the same day. She went into dry dock on April 25, where the tail end shafts were repaired, two plates renewed, two others faired in place, some caulking done, and the hull scraped and painted up to the water line. On May 13 the *Beaujeu* came out of dry dock. She took coal on the 14th and arrived at her station at St. Thomas channel on the same day. She worked there until May 21, when she was run into by the ss. *War Beryl* of the C.P.O.S., and badly damaged forward. She proceeded to Quebec the same day, remaining there until the Inquiry had been held by the wreck commissioner. She came up to Sorel, May 29, and was there until June 24 undergoing repairs.

Dredge *Beaujeu* left Sorel June 24, arrived at St. Thomas channel, June 25, and resumed dredging the same date. She was employed here, cleaning up some "silting in" that had taken place in this channel, the material to be moved being clay and stones. On October 7, work was stopped for the season. She left St. Thomas channel October 8, arrived at Sorel, October 9, and went into winter quarters.

During the season *No. 8* worked 95 days and her machinery was in actual operation 79 per cent of the full working time.

The total number of cubic yards removed amounted to 131,900 at a cost of \$156,489.34 or  $\$1.18\frac{64}{100}$  cents per cubic yard.

The total number cubic yards removed by the whole of the dredging fleet amounted to 517,305 at a total cost of \$422,107.05 or  $\$1\frac{59}{100}$  cents per cubic yard.



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AVERAGE DEPTH for each month in the 27½ foot channel (27½ feet at ordinary low water) from Sorel Gauge during each year May to November.

Year.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Highest.	Lowest.
	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.	Ft. in.
1892.....	31 0	31 9	31 6	30 6	28 9	28 3	28 3	33 6	27 3
1893.....	36 0	34 3	30 9	29 9	29 6	28 6	28 0	37 6	27 6
1894.....	34 6	31 9	31 0	29 2	28 3	28 9	29 0	36 0	27 7
1895.....	33 3	31 3	28 3	28 3	27 6	26 9	26 9	34 6	25 10
1896.....	33 6	30 6	28 9	28 0	27 6	27 9	29 0	37 0	27 4
1897.....	35 6	32 6	30 3	29 3	28 0	27 0	27 6	37 0	26 5
1898.....	31 6	30 9	29 8	28 2	28 2	28 3	28 6	32 1	26 9
1899.....	36 2	31 9	30 3	28 6	27 6	28 0	27 9	37 9	26 9
1900.....	33 6	30 9	30 6	29 6	28 1	28 9	29 2	35 9	27 4
1901.....	34 3	31 10	29 2	28 3	27 7	27 4	27 3	36 3	26 6
1902.....	32 2	32 2	32 2	29 4	28 1	28 1	29 0	34 1	27 6
1903.....	33 0	30 11	30 5	29 5	28 4	29 0	27 11	32 8	26 11
1904.....	36 3	34 5	30 9	29 5	29 5	30 4	29 3	37 4	28 1
1905.....	31 10	30 8	29 7	29 0	28 0	28 5	28 1	33 6	27 1
1906.....	32 4	31 5	29 3	27 11	27 3	27 4	27 6	33 3	26 9

AVERAGE DEPTH for each month in the 30-foot channel (30 feet at extreme low water of 1897).

1907.....	37 1	35 9	34 3	32 10	32 4	32 9	33 7	38 3	31 10
1908.....	41 5	37 10	33 10	32 10	32 0	31 0	30 6	42 4	30 0
1909.....	40 6	37 6	33 10	33 2	32 7	32 4	31 6	42 7	30 11
1910.....	35 7	34 5	32 3	31 7	31 6	31 6	31 7	37 1	30 7
1911.....	36 6	34 6	32 1	31 3	30 9	30 2	30 3	38 1	29 4
1912.....	37 9	37 6	33 6	32 8	32 6	32 6	34 9	40 11	31 3
1913.....	37 0	34 4	32 8	31 10	31 6	32 1	32 7	38 6	31 1
1914.....	35 2	33 0	32 4	31 4	31 3	30 11	31 0	36 10	30 3
1915.....	34 7	32 6	31 6	31 4	31 1	30 11	30 8	37 4	30 1
1916.....	38 9	37 2	34 0	32 5	31 7	31 9	31 10	40 0	30 9
1917.....	36 8	36 6	34 10	33 6	32 3	32 6	33 0	38 2	31 3
1918.....	36 1	34 1	33 10	32 0	32 3	33 7	34 11	38 1	31 3
1919.....	39 7	36 7	33 5	32 4	32 3	32 8	33 5	41 1	31 3

COST OF SHIP CHANNEL TO DATE—Table showing the Total Cost of the Dredging and Plant and the Quantities dredged to March 31, 1920.

	Cost of Dredging.	Expenditure for plant, shops, surveys, etc.	Quantities dredged.
	\$ cts.	\$ cts.	Cu. Yds.
MONTREAL HARBOUR COMMISSIONERS, 1851 to 1888.			
Dredging Montreal to Cap a la Roche to 27½ feet at O.L.W. and from Cap a la Roche to Quebec to 27½ feet at half tide.....	3,402,494 35	534,809 65	19,865,693
DEPARTMENT OF PUBLIC WORKS.			
Dredging consisting of widening and cleaning up of channel, deepening Cap a la Roche to Cap Charles to 27½ ft. at O.L.W. and dredging at Grondines, Lotbiniere and Ste. Croix, 1889 to June 30, 1899.....	829,583 08	486,971 79	3,558,733
PROJECT OF 1899.			
Dredging Channel between Montreal and Quebec to 30 feet at lowest water of 1897, also widening to a minimum width of 450 feet and straightening.....			
Fiscal year 1899-1900.....	100,191 01	265,270 78	1,107,894
" " 1900-1901.....	136,680 83	287,040 04	2,479,385
" " 1901-1902.....	185,429 80	479,731 47	3,098,350
" " 1902-1903.....	255,776 55	277,703 50	6,544,605
" " 1903-1904.....	276,958 59	308,765 44	4,619,260
DEPARTMENT OF MARINE AND FISHERIES.			
This includes the work below Quebec.			
Fiscal Year 1904-1905.....	311,087 93	277,225 69	2,716,220
" " 1905-1906.....	431,768 30	317,327 37	4,047,530
" " 1906-1907.....	302,677 37	275,003 61	3,001,010
(July 1, 1906, to March 31, 1907)...			
Fiscal Year 1907-1908.....	478,209 66	417,390 22	4,831,875
" " 1908-1909.....	497,686 03	340,861 86	5,896,737
" " 1909-1910.....	572,950 71	321,375 80	6,354,285
" " 1910-1911.....	576,838 02	488,248 88	5,600,050
" " 1911-1912.....	588,697 60	499,799 58	4,509,904
" " 1912-1913.....	663,229 74	430,107 86	6,929,344
" " 1913-1914.....	895,235 59	426,018 12	6,140,867
" " 1914-1915.....	1,036,846 65	327,975 71	6,225,143
" " 1915-1916.....	976,622 03	771,760 03	8,462,957
" " 1916-1917.....	1,030,550 60	437,469 62	7,800,555
" " 1917-1918.....	618,399 69	136,765 97	2,517,376
" " 1918-1919.....	350,152 92	79,797 45	628,060
" " 1919-1920.....	422,105 05	132,747 20	517,305
	14,940,174 10	8,320,167 64	117,453,139



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PROGRESS of Dredging Operations at Date of Writing the close of the Season 1919, 30-foot project.

Locality.	Distance, English miles.	Total length, requiring dredging.	Length dredged in 1919.	Total length of 30-foot channel dredged.	Length yet to be dredged.
Division 1:— Montreal to Sorel.....	45	Miles. 22.90	Miles. .....	Miles. 22.90	Miles. All completed.
Division 2:— Sorel to Batiscan.....	36	12.45	.....	12.45	All completed.
Division No. 3:— Lake St. Peter.....	20	18.00	.....	* 0.50 †17.50	
Division No. 4:— Batiscan to Quebec.....	59	10.00	0.06	8.42	1.58
Division No. 5:— Quebec to The Traverse.....	60	4.65	.....	4.65	
Total.....	220	68.00	0.06	66.42	1.58

\*Not widened.    †Widened.

PROGRESS of the Dredging Operations at the Date of Writing the close of the Season of 1919, 30-foot project.

Locality.	Length of Dredging.		Cubic Yards yet required to be done.
	Required.	Done.	
Division 1:— Longueuil Shoal.....	Miles. .....	Miles. 1.10	
Longue Pte. to Pte. aux Trembles (E.H.).....	.....	5.05	
Ile Ste. Therese.....	.....	0.40	
Varennes to Cap St. Michel.....	.....	3.00	
Cap St. Michel to Vercheres.....	.....	4.50	
Vercheres Traverse.....	.....	1.10	
Vercheres to Contrecoeur.....	.....	1.70	
Contrecoeur Channel.....	.....	6.05	
Total.....		22.90	
Division 2:— Sorel to Ile de Grace.....		4.40	
Stone Island.....		1.10	
Ile aux Raisins..		0.25	
Lake St. Peter (See Div. 3).....			
Port St. Francis.....		0.50	
Three Rivers.....		0.50	
Cap Madaline to Becancour.....		1.55	
Becancour to Champlain.....		2.25	
Champlain to Pte. Citrouille.....		1.30	
Batture Perron.....		0.60	
Total.....		12.45	
Division 3:— Lake St. Peter.....		* 0.50 †17.50	200,000
Total.....		18.00	200,000
Division 4:— Batiscan to Cap Levrard.....		3.00	
Cap a la Roche Channel.....	0.43	1.62	582,000
Pouillier Rayer.....		1.20	
Cap Charles.....		0.90	
Grondines.....		0.80	
Lotbiniere.....		0.40	
Cap. Sante.....		0.20	
Ste. Croix.....	0.60	0.30	300,000
St. Augustin.....	0.60		500,000
Total.....	1.63	8.42	1,382,000
Division 5:— Quebec to the Traverse.....		4.65	550,000
Total.....		4.65	550,000
Totals.....	1.63	66.42	2,132,000

\*Not widened.    †Widened.



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PROGRESS of Dredging Operations at Date of Writing the close of the Season of 1919, 35-foot project.

Locality.	Distance. English miles.	Total length. requiring dredging.	Length. dredged in 1919.	Total length of 35-foot channel dredged.	Length yet to be dredged.
Division 1:— Montreal to Sorel.....	Miles. 45	Miles. 23.63	Miles. 0.35	Miles. 17.11	Miles. 11.52
Division 2:— Sorel to Batiscan.....	36	19.75		6.10	13.65
Division 3:— Lake St. Peter.....	20	18.32		17.03	1.29
Division 4:— Batiscan to Quebec.....	59	15.54			15.54
Division 5:— Quebec to Goose Cape (North Channel)...	66	8.14		0.75	7.39
Total.....	226	90.38	0.35	40.99	49.39

PROGRESS of the Dredging Operations at the Date of Writing the Close of the Season of 1919, 35-foot project.

Locality.	Length of Dredging in Miles.		Cubic yards yet to be dredged.	Cubic yards dredged.
	Yet to be done.	Done.		
Division 1— Longueuil Shoal.....	1.88		593,859	127,595
Longue Pte. Traverse.....	0.39	0.08	443,592	51,550
Longue Pte. Curve.....	1.24	0.08	991,531	242,350
Pte. Aux Tremble Channel.....	0.05	3.02	53,625	1,223,475
Ile Ste. Therese Channel.....	1.12		146,611	
Varenes Curve.....	0.45	1.69	593,546	2,297,060
Cap St. Michel Curve.....	1.00		500,500	
Cap St. Michel to Vercheres.....	0.25	4.47	177,139	1,913,350
Vercheres Traverse.....	0.25	0.47	92,763	193,625
Vercheres to Contrecoeur.....	1.23	0.68	816,225	554,200
Contrecoeur Channel.....	2.31	5.97	2,038,532	3,574,343
Lanoraie to Sorel.....	0.61		159,215	
Total Division 1.....	10.78	16.46	6,607,138	10,177,548
Division 2:— Sorel to Ile de Grace.....	1.00	3.98	933,706	2,776,354
Stone Island.....	1.42	0.69	466,370	414,890
Ile aux Raisins.....	0.99	1.10	202,125	777,224
Port St. Francis.....	0.67	0.33	491,303	248,275
Three Rivers.....	0.72		533,192	
Cap Madeleine—Becancour.....	2.40		1,348,578	
Becancour—Champlain.....	1.16		932,750	
Champlain Pte. Citrouille.....	4.06		2,632,356	
Batture Perren.....	1.23		684,600	
Total Division 2.....	13.65	6.10	8,224,980	4,216,743
Division 3:— Lake St. Peter.....	1.29	17.03	1,161,570	11,335,582
Total Division 3.....	1.29	17.03	1,161,570	11,335,582
Division 4:— Batiscan—St. Levrard.....	4.48		2,386,168	
Cap Levrard.....	1.27		781,666	
Cap a la Roche Curve.....	2.06		1,836,859	
Cap Charles Channel.....	2.04		1,077,416	
Grondine.....	0.83		513,332	
Lotbiniere.....	0.47		321,480	
Cap Sante.....	1.51		655,561	
St. Croix.....	1.47		798,518	
St. Augustin.....	1.41		826,207	
Total Division 4.....	15.54		9,197,207	
Division 5:— Quebec to Goose Cape (North Channel).....	2.84		2,585,132	
Madame Reef Shoal.....				
West Sand and East Narrows Shoals.....	4.55	0.75	1,394,313	12,173,728
Total Division 5.....	7.39	0.75	3,979,445	12,173,728
Totals.....	48.65	40.34	29,170,340	37,903,601



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## ABSTRACT of Work of Dredging Fleet during Fiscal Year ended March 31, 19 20.

Dredge.	Locality of Dredging.	Time of Service.	Working hours, 10 per day.	Hours Actual Dredging.	No. of Scows Filled.	Cubic yds. Dredged (Scow Measure).	Depth of Dredging at L.W.	Width in Feet.	Character of Soil.	Remarks.
"Laval"—No. 1.....	Vercheres Traverse, . . . . . Longueuil Shoal.....	Days.	Hours.							
		105	1,050	829½	654	164,750	35.0	450	Clay.....	Capt. J. Baron.
		32	320	240½	92	23,000	35.0	200	Clay, stones, hard pan, shale, rock and boulders.	Widening.
		137	1,370	1,070	746	187,750				
Laurier—No. 2.....	Varenes Curve..... Champlain Channel . . . . .	42	420	339½	266	53,200	35.0	550-600	Clay.....	Capt. R. Matte.
		90	900	593	306	55,800	30.0	450	Sand (cleaning up)	
		132	1,320	932½	572	109,000				
		48	480	365½	159	29,295	35.0	200	Clay, stones, hard pan and boulders.....	Capt. P. Bibeau.
Lafontaine—No. 5.....	Cap a la Roche Curve...	87	870	444½	330	59,360	30.0	450-550	Shale rock and boulders.	
		135	1,350	810½	589	88,655				
		95	1,200	952½	117	131,900	30.0	1,000	Clay and stones.....	Capt. A. Bourget.
		95	1,200	952½	117	131,900				
Bouvier—No. 8.....	South channel, St. Thomas Bank.....					517,305	Total cubic yards dredged.			



## SOREL SHIPYARD.

## REPORT OF ACTING OFFICER IN CHARGE, L. LACOUTURE.

On April 1, 1919, the winter repairs and renewals to the St. Lawrence Ship Channel fleet and the Construction of Lights Department vessels were nearly all completed.

The outfitting was in progress, also the engaging of the crews for the new season's work.

The river Richelieu was clear of ice on March 27, and the St. Lawrence at Sorel on April 14.

The first dredge of the fleet left Sorel going into commission on May 5, 1919.

All the vessels in commission were maintained in good and serviceable condition during the season.

## NEW CONSTRUCTION.

No new vessels were built at the shipyard during the fiscal year 1919-20.

## BUOYS.

Fifty buoys of different designs, were constructed and shipped to various destinations during the fiscal year, viz.:—

- 1 gas and whistling buoy complete,
- 34 conical buoys,
- 6 bell buoy floats,
- 4 whistling buoys complete
- 5 steel ice buoys (alterations).

The Buoy Department was supplied with fittings and material such as rods, shackles, chains, hooks, chisels, etc.; repairs were also made to buoys.

## NAVAL SERVICE DEPARTMENT.

Work done for this department included supplies for yacht *Bethalma*. Coal clams returned from Halifax and used by the Naval Service Department were also unloaded and erected.

## ST. LAWRENCE SHIP CHANNEL.

Work done for this branch included making and repairing guage boards, iron posts, and supplying timber, etc.

## PRIVATE FIRMS.

*Canada Steamship Line*.—The steamer *Three Rivers* belonging to this firm was put on the ways for the winter, and heavy repairs were carried out to hull, rudder, etc.

*Sincennes McNaughton Line*.—Had use of shear legs and some welding done to boilers of tugs.

*Canadian Vickers, Limited*.—Pumping, clearing snow, and watching on board dredge No. 16.

*Sorel Mechanical Shops, Limited*.—The following vessels were put on the ways for this firm: steamer *Caspian*, November 6 to November 8; scow *Pennsylvania*, November 13 to November 19.



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*Prescott Dock and Ferry Co.*—On September 30 the steamer *Ferdinand* was put on the ways for repairs to hull, painting, and repairs to machinery and boiler.

*Barge Reliance.*—Belonging to A. Morgan, Esq., was hauled out on the ways on May 21, for examination and launched on July 21.

## GENERAL.

The shipyard launches *Bronx* and *Leros* were maintained in good order and painted. All the fences had necessary repairs during the season. The shipyard ways and wharves were repaired and kept in good condition.

The force employed during the fiscal year varied from 505 to 323 men, and averaged 414 men daily.

The financial statement shows the total amount expended on the shipyard and ship channel to have been \$556,244.24.

## EXPENDITURE AND REVENUE.

## STATEMENT of Expenditure and Revenue, Marine Department, 1919-20.

Service.	Appropriation.	Expenditure.	Balance.
	\$ cts.	\$ cts.	\$ cts.
<b>Ocean and river service—</b>			
Dominion steamers.....	1,500,000 00	1,447,842 36	52,157 64
Examination of Masters and Mates.....	18,000 00	17,375 73	624 27
Investigation into wrecks.....	12,300 00	6,795 03	5,504 97
Removal of obstructions.....	5,000 00	1,191 01	3,808 99
Registration of shipping.....	6,000 00	3,707 54	2,292 46
Expenses of schools of navigation.....	8,000 00	4,763 53	3,236 47
Cattle inspection.....	3,000 00	2,321 20	678 80
Subsidy to wrecking plant.....	35,000 00	35,000 00	
Unforeseen expenses.....	5,000 00	1,755 62	3,244 38
Boilers for ss. <i>Montcalm</i> .....	70,000 00	37,750 00	32,250 00
Motor patrol in British Columbia.....	50,000 00		50,000 00
	1,712,300 00	1,558,502 02	153,797 98
<b>Public Works—</b>			
Ship channel.....	478,000 00	484,186 19	
Dredging plant.....	68,900 00	65,964 03	2,935 97
Shipbuilding.....	40,000,000 00	33,014,389 63	6,985,610 37
Award, estate D. J. McCarthy.....	76,267 00	3,227 95	73,039 05
	40,623,167 00	33,567,767 80	7,061,585 39
Overdraft.....			6,186 19
			7,055,399 20
<b>Lighthouse and coast service—</b>			
Agencies, rents and contingencies.....	192,000 00	177,145 79	14,854 21
Salaries.....	600,000 00	599,979 11	20 89
Maintenance and repairs to lighthouses.....	750,000 00	751,953 19	
Construction of lighthouses.....	400,000 00	357,853 27	42,146 73
Administration of pilotage.....	200,000 00	103,913 17	96,086 83
Repairs to wharves.....	12,000 00	7,889 07	4,110 93
Royal Pilotage Commission.....	11,000 00	11,000 00	
Pensions to pilots.....	9,900 00	8,975 00	925 00
Telephones <i>re</i> aids to navigation.....	500 00		500 00
Breaking ice.....	40,000 00	40,000 00	
Allowance to harbour master, Amherstburg.....	400 00	400 00	
Allowance to Mrs. McMenemy.....	500 00	500 00	
Allowance to Mrs. Sherlock.....	500 00	500 00	
Signal service.....	60,000 00	59,839 55	160 45
Re und to Desjardins.....	56 50	56 50	
New L. H. and buoy, steamer <i>Maisonneuve</i> .....			
	2,276,856 50	2,120,004 65	158,805 04
Overdraft.....			1,953 19
			156,851 85



STATEMENT of Expenditure and Revenue, Marine Department, 1919-20—  
Concluded.

Service.	Appropriation.	Expenditure.	Balance.
	\$ cts.	\$ cts.	\$ cts.
Scientific Institutions— Meteorological service.....	210,880 00	200,733 94	10,146 06
Marine Hospitals and Distressed Seamen— Marine hospitals.....	97,500 00	47,337 18	50,162 82
Distressed seamen..	3,000 00	1,225 33	1,774 67
Seamen's hospital fund....			
	100,500 00	48,562 51	51,937 49
Steamboat Inspection— Steamboat inspection .....	87,827 77	82,633 45	5,194 32
Civil Government salaries.....	241,650 00	222,398 96	19,251 04
Contingencies.....	36,600 00	36,140 37	459 63
	45,289,781 27	37,836,743 70	7,453,037 57
Miscellaneous— Bonus.....		461,511 53	
Gratuities .....		2,824 73	
Grand totals.....	45,289,781 27	38,301,079 96	7,453,037 57

RECAPITULATION OF SERVICES.

Ocean and river service.....	1,712,300 00	1,558,502 02	153,797 98
Public works.....	40,623,167 00	33,567,767 80	7,055,399 20
Lighthouse and coast service.....	2,276,856 50	2,120,004 65	156,851 85
Scientific institutions.....	210,880 00	200,733 94	10,146 06
Marine hospitals.....	100,500 00	48,562 51	51,937 49
Steamboat inspection .....	87,827 77	82,633 45	5,194 32
Civil Government salaries.....	241,650 00	222,398 96	19,251 04
Contingencies.....	36,600 00	36,140 37	459 63
	45,289,781 27	37,836,743 70	7,453,037 57
Miscellaneous .....		464,336 26	
	45,289,781 27	38,301,079 96	7,453,037 57

	Gross.	Refunds.	Net.
	\$ cts.	\$ cts.	\$ cts.
Piers and wharves.....	70,568 09	709 08	69,859 01
Harbours.....	1,350 94		1,350 94
Dominion Steamers.			
Montcalm—Freight, \$2,238.63; passengers, \$169.85.....	2,408 48	4 50	13,181 36
Champlain—Freight, \$2,570.29; passengers, \$7,981.34; meals, \$225.75. ....	10,777 38		
Signal service dues.....	621 00		621 00
Marine register fees.....	82 74		82 74
Sick Mariners' fund.....	46,353 87	40 03	46,313 84
Examination, masters and mates.....	3,893 00	30 00	3,863 00
Steamboat inspection fund.....	3,048 64		3,048 64
Steamboat engineers' fees.....	1,545 00		1,545 00
Decayed pilots fund.....	5,304 09		5,304 09
Fines and forfeitures.....	411 60	99 10	312 50
Casual revenue.....	113,361 04	395 74	112,965 30
Halifax pilots' general account.....	4,261 05		4,261 05
Halifax pilots' pension fund.....	4,664 19		4,664 19
British Columbia pilotage revenue.....	34,869 32	348 82	34,520 50
British Columbia retirement fund.....	1,105 00		1,105 00
C. S. insurance.....	3 71		3 71
	304,629 14	1,627 27	303,001 87



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## METEOROLOGICAL SERVICE.

## REPORT OF SIR FREDERIC STUPART, DIRECTOR.

Meteorological returns have been received at the Central office from 615 stations, exclusive of 111 storm signal stations. Twenty-seven stations have ceased reporting during the year, while on the other hand 29 have been added to the list.

The following are the new stations:—

## STATION.

Aberdeen Lake, B.C.	Causapscal, Que.
Alexis, B.C.	East Angus, Que.
Campbell Lake, B.C.	Shipshaw River, Que.
Duncan, B.C.	St. Donat, Que.
Malahat Beach, B.C.	Boiestown, N.B.
Savary Island, B.C.	Chipman, N.B.
Vernon, B.C.	Hardwood Ridge, N.B.
Barons, Alta.	St. George, N.B.
Makepeace, Alta.	St. Quentin, N.B.
Spray Lakes, Alta.	Upsalquitch, N.B.
Strathcona, Alta.	Mount Uniacke, N.S.
Espanola, Ont.	Port Clyde, N.S.
Niagara Falls, Ont.	Springfield, N.S.
Whitby, Ont.	Tra'algar, N.S.
Berthierville, Que.	

## CENTRAL OFFICE.

The regular recognized work of the Central office has been carried on systematically throughout the year. Forecasts have been issued twice daily to all parts of the Dominion, exclusive of British Columbia, and to Newfoundland. Since the early spring the weather bulletins have been supplied with the utmost despatch to the British Admiralty through Halifax, and also the Government wireless stations for transmission over the Atlantic routes. Also, when deemed necessary, warnings of expected storms have been issued to those ports which are equipped with storm signals.

The warning service was continued throughout the year to ports on the Nova Scotia coast and the season of navigation on the Great Lakes and gulf of St. Lawrence. The severest storm of the season on the Great Lakes was that of November 29, but owing to the lateness of the season and the issue of a timely warning, there were few, if any, marine disasters. A succession of noteworthy storms passed across the Maritime Provinces during February and the first part of March, several of the gales being of great violence. Shipping was warned in each instance.

The following stations were inspected from the Central office: Grimsby, Rock Chapel, Port Dalhousie, Southampton, Parry Sound, Depot Harbour, Coldwater, Orillia, Midland, Port McNicoll, Collingwood, Meaford, Owen Sound, Wiarton, Tobermory, Cabot Head, Kincardine, Bayfield, Goderich, Arkona, Sarnia, Burlington, Brantford, Port Burwell, Port Dover, Port Colborne, Welland, Oakville, Oshawa, Cobourg, Port Hope and Kingston.

The daily weather map containing the data on which forecasts are based, has as for years past been printed in Toronto, and distributed quite widely both in that city and in the country generally, and quite recently arrangements have been completed whereby a similar map will be printed in Winnipeg in order to serve Manitoba.

*Publications.*—Each day 417 weather maps have been distributed, chiefly in Toronto, but many go to outside places, particularly schools. Each month 659 monthly weather maps and 496 copies of the Canadian Weather Record have been sent out; of annual issues 127 copies of the 1918 Toronto Observatory Year



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Book and 64 copies of the Toronto Observatory Magnetic Report have been distributed. Books and periodicals received have numbered 269, besides numerous pamphlets.

#### PHYSICS BRANCH.

It was about the middle of September, 1919, before Mr. J. Patterson, M.A., had sufficiently perfected the process of separating helium from natural gas, on which he had been engaged for nearly two years with the Department of Experiment and Research of the Board of Invention and Research of the Admiralty, to enable him to resume his duties at the Meteorological office. Since that time he has devoted his time to getting the work of the Physics Branch organized.

The investigation of the upper atmosphere by means of balloons carrying instruments was started immediately, but the company from whom the balloons were obtained have been unable to supply more than two or three, and the work has been temporarily held up until they can furnish them regularly.

Arrangements were nearly completed to send an observer to Fort Good Hope to take magnetic and meteorological observations and send up pilot balloons in co-operation with the Amundsen Expedition before the announcement of Amundsen's expected arrival at Nome was received. It has now been decided by the international committee in charge to postpone this work for one year.

It is expected that during the year at least seven pilot balloon stations will be established across Canada to meet the requirements of the Air Board and for investigating the upper atmosphere.

The investigations on solar radiation and atmospheric electricity will be resumed during the year and it is also hoped to commence work on earth and ocean temperatures.

#### CLIMATOLOGY AND AGRICULTURAL METEOROLOGY.

The Monthly Record of Canadian meteorological data has been printed more promptly than ever before. The preliminary monthly map giving a summary of the weather of the Dominion for each month four days after it closes, has been continued and improved; also the 79th Annual Report of the Toronto Observatory has been published.

Special attention is being given to the weather of the western provinces, where the dependability of average or better than average weather is being worked out with the idea of mapping out the risks of farming in each district, depending upon the weather alone. The scarcity of observations of rainfall has been a serious drawback and it is hoped that a greater number of rainfall stations may be opened in the future.

Statistical studies of the yield of wheat and oats have been continued and a comprehensive attempt to abstract from all publications of other departments every reference to crops and the weather has been begun with the idea of determining to what extent other departments of the Government could co-operate with us in obtaining data valuable for study in agricultural meteorology without much extra effort or expense.

A paper outlining the main features of a study of the relation of the weather to the quality and yield of the sugar beet will be published this year.

Attention is devoted to the possibility of issuing special forecasts of settled weather conditions about a week in advance during harvest time, but so far we have not felt justified in issuing bulletins to the farming community.

During the fiscal year ending March 31, 1920, the photographic records of the daily changes in the magnetic elements at Agincourt were obtained without material loss. Magnetic disturbances were of frequent occurrence and often



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for short periods passed beyond the recording limits of our instruments. The most pronounced disturbances took place on the following dates: 1919—April 7, 17; May 2, 3; August 11, 12; September 19, 20; October, 1, 2, 3, 5, 6, 23; December 14, 15. 1920—March 4, 5, 22, 23.

Absolute observations were made weekly to keep control of the base line values of the differential instruments.

Tables showing the magnetic character of each day have been forwarded as usual to the International Commission on Terrestrial Magnetism. The days selected by the commission for analysis have been used in the preparation of the magnetic reports for both Agincourt and Meanook. The report for 1918 is now in progress.

At the request of the Surveyor-General, index corrections for the compasses attached to seventy-one surveyor's theodolites were determined and the results forwarded to him.

Assistance was given to several members of the staff of the Surveyor-General's Department in determining the constants of their total force instruments both before and after their field work, and also to Mr. French, of the Dominion Observatory, in standardizing his magnetometer both before and after his field work.

Special observations were made during the total solar eclipse of May 29 at the request of Dr. Bauer, Director of the Department of Terrestrial Magnetism, Carnegie Institution, Washington, and a report of the results forwarded to him.

At Meanook only the declination changes are observed photographically and the instrument for this purpose was maintained in operation throughout the year. During the very cold weather of the winter, difficulty was again experienced in keeping the clocks running and a considerable number of hours of record were lost.

Weekly observations were made of declination, inclination and twice monthly of horizontal force.

The accompanying tables give a summary of the results obtained at Agincourt and Meanook during the fiscal year 1919-20.

## DAILY and Monthly Ranges.

Month.	D Mean Daily Range		Absolute Monthly Range.	H Mean Daily Range		Absolute Monthly Range.	Z Mean Daily Range		Abso- lute Monthly Range.
	From Hourly Readings	From Max. and Min.		From Hourly Readings.	From Max. and Min.		From Hourly Readings.	From Max. and Min.	
1919.									
April.....	13.6	25.7	1 12.6	52	106	504	29	68	381
May.....	11.5	32.9	2 21.9	66	153	783	57	126	540
June.....	15.6	21.2	0 47.1	54	81	169	19	57	170
July.....	14.9	20.6	0 49.9	48	82	338	19	51	352
August.....	17.1	31.7	3 43.7	66	128	930	34	92	979
September.....	13.5	29.9	1 37.8	51	108	515	39	90	474
October.....	10.1	37.7	2 27.0	48	151	882	38	112	617
November.....	6.8	15.2	0 52.3	24	47	150	9	39	123
December.....	6.2	16.5	1 27.1	22	62	422	19	37	386
1920.									
January.....	8.6	15.1	0 31.6	34	53	98	7	31	53
February.....	9.4	14.8	0 43.8	31	52	155	9	19	102
March.....	11.2	33.6	3 47.8	70	159	1,192	22	107	1,069



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SUMMARY of Results of Magnetic Observations made at Agincourt for the Fiscal Year 1919-20.

Month.	Mean Monthly Values.			
	D. West.	H	Z	I
	' °	γ	γ	' °
1919.				
April.....	6 40.4	15,894	58,281	74 44.8
May.....	40.2	891	273	44.8
June.....	39.9	903	250	43.8
July.....	40.2	897	240	44.0
August.....	41.8	873	234	45.2
September.....	42.2	866	228	45.5
October.....	42.5	863	233	45.7
November.....	42.5	878	221	44.7
December.....	42.9	878	224	44.7
1920.				
January.....	43.4	884	226	44.5
February.....	43.7	880	221	44.6
March.....	44.8	858	215	45.7

SUMMARY of Results of Magnetic Observations made at Meanook for the Fiscal Year 1919-20.

Month.	Mean Monthly Values.			
	D. East.	H	Z	I
	' °	γ	γ	' °
1919.				
April.....	27 41.3	12,948	60,414	77 54.2
May.....	41.0	56	345	53.5
June.....	39.2	48	346	53.4
July.....	39.5	59	326	54.2
August.....	40.6	46	465	54.9
September.....	41.0	56	460	54.3
October.....	41.1	54	468	54.5
November.....	40.8	31	369	54.6
December.....	40.5	29	291	53.8
1920.				
January.....	39.9	34	375	54.5
February.....	39.6	19	219	53.5
March.....	40.6	12	298	54.8

MEANOOK Daily and Monthly Ranges.

Month.	From hourly readings.	From Max. and Min.	Absolute Monthly Range.
			' °
1919.			
April.....	14.4	57.6	3 27.9
May.....	19.9	61.5	3 09.5
June.....	18.5	31.2	1 35.7
July.....	18.0	35.1	2 20.2
August.....	21.7	49.4	3 56.9
September.....	16.5	50.2	3 31.3
October.....	10.7	72.5	3 55.8
November.....	6.3	28.8	2 18.2
December.....	8.8	32.9	3 51.4
1920.			
January.....	6.8	24.1	1 37.2
February.....	6.4	28.3	2 49.3
March.....	11.9	69.6	5 06.6



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## TIME SERVICE.

During the year ending March 31, 1920, seventy-three determinations for time were made by transit of stars in the meridian with the 3-inch Troughton and Simms transit instrument. The positions of the stars have been taken from the American Ephemeris and the British Nautical Almanac.

The collimation error of the transit instrument has been determined by reversal on the wires in the collimating telescope, reversal upon Polaris, and in conjunction with the determination of the instrumental azimuth error by suitable star transits in reverse and direct positions of the axis using a least square computation.

The different clocks have performed very satisfactorily but there is a great need of an additional mean time clock and chronometer.

The magneta clock and secondary circuits have not failed throughout the year and are in first-class condition.

The usual time exchanges between Toronto and Quebec, Montreal and St. John, N.B., have been made, being recorded on the chronographs at Toronto, Montreal, and St. John. The errors of the clock have been computed from the latest observations.

The 11:55 a.m. signals have been given over the fire-alarm systems throughout the year.

Time has been given weekly to the Magnetic Observatory at Agincourt and daily to the C.N.R. running out of Toronto.

The following table will show the differences between the times at the several observatories and that at Toronto. The sign + indicates slow of Toronto:—

Date.	Montreal.	Quebec.	St. John.
1919.	Seconds.	Seconds.	Seconds.
April 25..	—0.90	—0.45	—0.41
May 9..	—1.05	—0.04	—0.87
June 6..	—1.01	—0.84	a
July 11..	—0.93	+0.50	a
August 5..	—0.69	+0.17	—0.27
August 29..	—0.55	—0.55	—0.07
September 19..	+1.16	+0.07	—0.53
October 10..		+1.70	—0.18
October 31..	—0.39	+0.75	+0.02
November 21..	+0.11	+0.49	+0.29
December 5..	+0.63	—4.01	+0.22
December 19..	+0.61	+3.18	+0.71
1920.			
January 9..	+0.70	+0.40	+0.40
January 30..	—0.56	—0.09	+0.20
March 19..	—0.80	+1.01	—0.27
Mean difference..	—0.26	+0.5	—0.06
Total range..	2.21	7.19	1.58

a. Observer away.  
t. Wire trouble.

## SOLAR OBSERVATIONS.

The sun was observed on 160 days and on all of those days spots were visible. Maps were made with the 6-inch Cook refracting equatorial telescope using a 50-power eye-piece, the projected image being 5 inches in diameter.

The principal sunspot groups occurring February 1 to 12, three large groups, two north and one south of the equator.

On May 9 a large group of small spots with a very large penumbral spot preceding, was central on the sun.

June 16 to 23, two groups of large penumbral spots north and south of the equator, and again a very large disturbed area was visible from August 15 to 24, being central on the 19th.



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The mean sunspot relative numbers for the months of the civil year ending December 31, 1919, were: January, 68.3, February, 94.7, March, 67.5, April 64.5, May 95.9, June 139.7, July 83.2, August 102.6, September 61.7, October 62.2, November, 46.7, December 57.6, Yearly mean 78.7 being slightly in excess of that of 1918 (74.6). These relative numbers are computed from Wolf's formula,  $r=10 g + f$  where  $g$  is the number of groups visible on any day and  $f$  the total number of spots, whether they were in groups or isolated.

## SEISMOLOGICAL OBSERVATIONS.

The Milne seismographs at Toronto and Victoria have been kept in efficient working order, with comparatively little loss of record, throughout the fiscal year. No change has been made in the adjustments of the instruments, both booms being kept at a period of 18 seconds.

In Toronto, 158 unfelt earthquakes were recorded. This is the largest number recorded at Toronto in any year, being 61 greater than average as deduced from 21 years' data, and 24 greater than recorded last year. The largest monthly total, 21, occurred in May, and the least, 5, in February. There has been marked increased seismic activity since 1914.

The most important quakes were recorded on April 17 and 30, May 3 and 6, August 29 and 31, September 6, January 4 and March 29.

The tidal gauges at San Francisco and other stations on the Pacific coast recorded sea waves caused by the earthquake of April 30, the principal effect lasting from 12 to 20 hours. Records from various seismographs show that there were two earthquakes on the 30th, and the times not being far apart, various phases overlapped, the principal one occurring at 7h. 16m. G.M.T., with epicentre approximately in latitude  $6^{\circ} 48^3$  south, and longitude  $158^{\circ}$  west.

The origin of the earthquake of January 4 was near mount Orizaba, a volcano situated about seventy miles west of Vera Cruz. In this vicinity the most serious damage was done. The amplitudes of record for this earthquake at Toronto and Victoria were not commensurable with the destructiveness in the region of origin, possibly owing to its volcanic nature.

We forward abstracts of all our observations to various seismological centres throughout the world and receive a number of bulletins in return. We also publish the records in several journals, and there is increased demand from various societies for copies of our data. We furnish the Associated Press with information, by request, concerning the character of any large earthquake and the distance to the epicentre as ascertained from the times of arrival of the various phases. The Toronto evening papers are sometimes supplied with bromide copies of the record.

Epicentres of all large earthquakes are determined after sufficient and trustworthy seismological data are received to base the plotting on.

Investigation regarding the correlation of microseism and meteorological phenomena has been regularly carried out by examination of the daily weather map and local temperatures. These mysterious pulsations suddenly appear at times and continue for days, then as suddenly disappear. They were supposed to be caused by convection currents set up in the instrument room, but lately it has been concluded that the majority of them are seismic in nature. They often mask the various waves on a record.

We systematically group records of large earthquakes emanating from similar centres and find a strong resemblance in many of the features of the records so that knowing the areas of seismic activity, one may sometimes be able to locate a particular earthquake, by the study of a single seismogram.

It is hoped shortly to install the Milne-Shaw type of instrument, both at Victoria and at Toronto. This is the instrument adopted by the British Asso-



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ciation; also in the near future to equip the Magnetic Observatory at Meanook, Alberta, with a similar instrument.

## PHENOLOGICAL OBSERVATIONS.

The reports received from observers during the past year were excellent. These reports of the dates of flowering of plants, ploughing, sowing, reaping, etc., not only indicate fairly the climatic conditions of a district, but add to our knowledge of the effect of weather upon agriculture. Excellent schedules with average dates for Nova Scotia were received from Dr. A. H. Mackay, Superintendent of Education, for that province, and we are indebted to Mr. W. H. Magee, Inspector of Schools for part of Saskatchewan, who also kindly supplied schedules. The results of these observations which are published in the Annual Supplement of the Monthly Meteorological Record, also in the Annual Report of the Royal Society of Canada, were prepared by Mr. F. F. Payne, of the Central office.

## OUTSIDE STATIONS.

The 611 Meteorological stations reporting to the Central office, are divided into two divisions, the first of which includes 333 stations where the observing is performed voluntarily by observers who keep a daily record of the weather, using instruments furnished by the Government. In many instances the record kept is most comprehensive, and to the observers at these stations the country owes a debt of gratitude for data which is of great value. In the other division are 278 stations where remuneration is allowed. Those stations are divided into various classes, according to the work performed, as follows: 15 Chief stations, 41 Telegraph stations, 109 Rainfall stations; 72 Climatological stations, 39 Bulletin stations and 2 Magnetic stations.

There are also 101 meteorological agents whose duty it is to attend to the display of storm signals.

The daily forecasts are based on bi-daily reports from 41 Telegraph Reporting stations and 6 of the Chief stations, together with about one hundred reports from the United States. The utmost regularity and promptness is required from observers at these stations in filing their reports for transmission by wire to the Central office, every day throughout the year, including Sundays and holidays.

The reports of the more important Meteorological stations, Victoria, B.C., Montreal, Quebec, and St. John, are given in appendices, A. B. C. D.

## APPENDIX "A."

The Director of the Quebec observatory reports as follows:—

As in the past, the usual daily observations were taken regularly, and the various instruments under my care have been kept in good order.

Statistics and reports on the weather conditions were given to the public, and this office is growing in importance in that respect.

Reports were also furnished to our local civil courts with regard to precipitation and wind storms, etc., in various cases in which such data were required.

The time-ball, which has been in operation during the whole navigation season last year, is now being overhauled to be made ready for the next season, which is expected to take place in the very near future.

## APPENDIX "B."

The Director of the St. John, N.B. observatory reports as follows:—

The tri-daily meteorological observations have been carried on at 9 a.m., 3 p.m. and 9 p.m. without change from my former report. Results of the morn-



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ing and night observations were immediately coded and telegraphed to the Central office, Toronto, for use of the weather chart. The eye readings at the above mentioned fixed intervals made with the standard or control instruments serve to check the autographic recorders which continuously register barometric pressure, temperature and humidity, from these instruments as well as the sunshine recorder, electrical rainfall and wind direction and velocity registers, hourly values are abstracted and daily and monthly means computed. An additional reading of the various instruments and general condition of the weather is made at noon to accompany the daily report furnished the afternoon newspapers.

No material changes have been made in the meteorological equipment or the exposures.

The wind instruments at Point Lepreaux continue to give valuable records of direction and velocity in that vicinity. The daily record sheets from the register at that station have been sent here weekly for analysis and tabulation. The anemometers at this station as well as at St. John have been frequently changed and cleaned to maintain them in efficient working condition.

The weather bulletin has been printed in the observatory every week day morning immediately after receipt of the telegraphic message from Toronto. The forecasts, synopsis of prevailing data from selected stations provide most satisfactory information, which is of great value to mariners, shippers and other interests depending largely on weather conditions. Copies of this bulletin are posted in public places, distributed through the mail and published in afternoon newspapers.

The New Brunswick Telephone Company continues the courtesy of telephoning the forecasts to their various offices throughout the province.

Numerous calls by telephone are daily received for the time, weather forecasts and other information connected with the service. During the past year the clerical work in answering correspondents for statistics and for special information required by transportation companies and others has decidedly increased, much detailed information is required particularly during the winter months when shipments through this port are most extensive and at other times when engineers are making surveys and investigations.

The reports received monthly from all stations in the Maritime Provinces have been checked and many of them summed and meaned. After entering the necessary data in our abstract registers they have been forwarded to the Central office at Toronto. Statistics from these are available here to reply promptly to inquiries for data covering different places in the Maritime Provinces. During the past year several new temperature and rainfall stations have been opened at places not heretofore reporting.

#### MARITIME PROVINCE TIME SERVICE.

For the determination of the errors and rates of the sidereal clocks, observations of standard stars were made entirely by the transit micrometer method, the records from the contact points on the micrometer head recording on the chronograph along with the seconds of the observing clock. Reversals were made on each star to eliminate collimation and pivot error corrections, nine contacts being made on each position of the axis and from six to ten stars including not less than two polars for azimuth. The Riefler sidereal clock in the basement clock room has been run under constant pressure and temperature. The sealing of the clock continues absolutely perfect, and no use of the air pump was necessary. The Kullberg sidereal clock was cleaned and is now in perfect condition. The rates of both these clocks have been small and steady.

The mean time transmitting clock was cleaned in March and its electrical attachments for automatically sending the time signals re-adjusted. The



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various electrical appliances connected with the transmission of time signals and synchronizing clocks are in good condition. The 10 a.m. Atlantic Standard time signals have been regularly continued. Special signals frequently called for are transmitted by telegraph or telephone, the beats of the clock relay being quite audible in the long distance and local receivers.

The St. John time-ball has been dropped each week-day at 1 p.m. Atlantic Standard, excepting for several days in February owing to a severe ice storm on the sixth of that month which completely interrupted all local wire service. The system of hourly synchronizing tower, street, bank, office and factory clocks in St. John, by direct wire from the observatory, continues to be most useful and satisfactory. Some chronometer and watch adjusters have clocks which are hourly corrected by the synchronizing signal, others have bells which give an audible signal every hour, and some take the beats from the clock relay through the telephone. The public generally make many calls daily for the correct time.

The Halifax time-ball has been dropped each week-day at 1 p.m. Atlantic Standard, by time signals from this observatory through the master clock in the Western Union office there, which is automatically corrected by the 10 a.m. time signal from St. John; occasionally, owing to wire or other troubles, the signal has to be repeated at following hours. Many of the watch and chronometer adjusters in Halifax, the Admiralty, Cable Docks, Nova Scotia Telephone Company and others have wire connections with the Western Union, and receive the daily signals.

Watch inspectors of the Canadian National Railways in the Maritime Provinces have wire connections with sounders on their premises to receive the signal from the observatory.

The observatory grounds have been maintained in good condition, particularly the spacious lawn, where the outside meteorological instruments are exposed.

## APPENDIX "C."

The Director of the Gonzales Heights observatory, Victoria, B.C., reports as follows:—

During the past year the regular meteorological observations have been taken and daily weather forecasts issued for Vancouver island, the lower mainland, Kamloops and Kootenay districts. Arrangements have also been made to furnish special weather forecasts for the benefit of the fruit growers in the Okanagan Lake district. These will be issued during the spring and early summer as a means of warning the growers of the probable advent of serious frosts, and in the autumn and early winter warnings will be issued in connection with the probable approach of pronounced cold spells for the benefit of fruit shippers desirous of forwarding fruit through the mountains to the Prairie Provinces.

Storm warnings have been issued for Victoria, Vancouver and Nanaimo; these have been appreciated especially by owners of small craft, and numerous 'phone inquiries have been answered respecting general weather conditions, and when safe to leave port on towing and fishing operations.

Monthly summaries of the temperature and precipitation as obtained from our telegraph stations have been regularly published in the press of the province.

The monthly weather reports now received from 145 stations in this province and the Yukon have been regularly checked, entered in our register, then forwarded to you for publication. As numerous inquiries are received here for weather data on specified dates from our stations, I am now entering the daily



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readings here for all stations, as well as the monthly summaries, in order that prompt replies may be furnished inquirers.

#### TIME SERVICE.

Star transits have been taken at intervals and accurate time maintained. The time-ball which is installed on one of the highest city buildings has been dropped daily (including Sundays) at 1 p.m., and has throughout given perfect satisfaction.

Time is also furnished to numerous inquirers by the phone. At 10 a.m. daily the time is also sent from this office by wireless to all the radio stations within 300 miles, and all shipping within this area, including that in the ports of Vancouver and Nanaimo can also receive this time.

In order to obviate the present hand-sending method, I am pleased to state that I, in conjunction with Mr. Haughton, superintendent of our wireless service here, and members of his staff, have designed an automatic instrument which, started by our clock to the nearest tenth of one second, will send the international time signals by wireless for the period of three minutes. The exact termination of each minute being clearly defined.

The instrument, which was constructed in the wireless workshop here, is a very fine piece of mechanism and reflects great credit upon those engaged upon it.

It is expected to have this instrument in regular daily service very shortly.

During the past year over 1,800 visitors have been shown over this institution, and addresses bearing on the work of our service have been given both to school classes and at public meetings.

The following stations have been inspected during the year: Nanaimo, Entrance Island, Summerland (installed electric anemograph), Penticton, Keremeos, Nelson, Creston, Kaslo, Grand Forks, Osoyoos, Kelowna, Armstrong, Salmon Arm, Granite Peak, Kamloops, Tranquille, Quesnel, and Barkerville.

The past year has been remarkable for the large number of earthquakes recorded here, amounting to 149, which is the greatest annual number registered here since the seismograph was installed in 1899. The greatest monthly number of quakes was 20 in May, 1919, and February, 1920, while in September and November only 8 quakes were recorded in each month. During the night of January 23 an earthquake lasting several seconds was felt both on Vancouver island and about Vancouver city. It was well recorded here, and from careful measurements its origin appears to have been under the Strait of Georgia in the vicinity of Mayne island.

Certain necessary repairs and painting asked for have been completed by the Public Works Department in a most satisfactory manner pertaining to the interior of the building, and during the fine summer season the exterior walls and dome are to be cleaned and repainted white, which will certainly add greatly to the beauty of this building, as well as preventing further weather action now becoming apparent.

#### APPENDIX "D."

The Director of the McGill University observatory, Montreal, reports as follows:—

The prescribed work of this station has been carried on without interruption; all routine work has been punctually attended to. In addition to daily weather summaries to the press and printed abstracts, inquiries by telephone or letter or personal applications for information on weather particulars or climatic data are being met. The daily forecast from the Central office is frequently called for.



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Time signals have been supplied to the city, the commissioners of the harbour, the Canadian Pacific and Grand Trunk railways, various jewellers and corporations.

The staff comprises the director, a young lady assistant and, when available, an observer for the 8 o'clock weather reports. The writer does the time service and part of the weather observing. The lady attends to the office, sends time signals, typewrites, and answers the telephone.

Certain particulars of improvements to the equipment may be given. A Howard astronomical clock from the Geodetic Laboratory was overhauled and installed in the observatory as a relief to the master clock in case of accident to the latter. The new arrival has attained surprisingly good time-keeping properties.

The Riefler and Ballou sidereal clocks were both cleaned and adjusted, and the four clocks are now running satisfactorily.

We were fortunate in arriving at this result without any expenditure. The labours of Mr. A. Stirling, than whom we can imagine no more skilled artist with timepieces, were given freely. We regret his removal of residence to Scotland. Mr. Stirling also rebuilt an astronomical clock, replacing the Howard taken from the Geodetic Department to the observatory, and kept all the observatory instruments in repair through the year.

A wireless receiving set was recently installed, but as yet is not sufficiently complete to receive the Arlington time.

The calendar record of difference of temperatures between the summit of Mount Royal and this station is still being kept up. We have long held the view that this investigation was as futile as it is ingenious. The differences are never, on our examination, following any rational system. Impending weather changes certainly are not indicated. It runs of its own inertia and costs about \$100 per year. I believe the Physics Department concurs in my views of its futility. We should very much like to have the distant thermometer a mile or so in the air with an assurance that all cable effects really were compensated. Something then would be added to knowledge.

Near the surface of the hill, and only some 500 feet above us, nothing may be expected, even if accurate differences were attained.

The Harbour Commissioners' time-ball is still unsuitably exposed to fulfil its main purpose; it cannot be seen from half the ships. The lack of current in their loop, or their defects, have caused several failures to drop the ball this year.

The Great Northwestern Telegraph Company have attended to our business satisfactorily.



REPORT OF L. A. DEMERS, WRECK COMMISSIONER.

Formal investigations during the year.....	22
Preliminary inquiries.....	4

During the calendar year 1919 there were 240 casualties reported to the department, the tonnage of same being 205,720 and the stated damage \$1,808,690, while 126 lives were lost.

Of this total number of casualties 207 were to coasting and sea-going vessels, the tonnage of same being 176,043 and the stated damage \$1,211,010; 100 lives were lost; 33 of the casualties were to inland vessels, the tonnage of same being 29,677 and the stated damage \$597,680.

In 150 cases of casualties to coasting and sea-going vessels and 18 to inland vessels, the amount of damage is not stated.

Sixty-four of the casualties to coasting and sea-going vessels, consisting of 21 steam and 43 sailing vessels, resulted in total losses, the tonnage of same being 27,249 (Canadian, 17,333; British, 2,816; foreign, 7,100).

Ten of the casualties to inland vessels, consisting of 9 steam and 1 sailing vessels, resulted in total losses, the tonnage of same being 6,837 (Canadian, 3,175; foreign, 3,662).

Casualties are given under the following headings:—

<i>Coasting and Sea-going Vessels.</i>	
Collisions.....	36
Foundering.....	30
Miscellaneous accidents: fire, loss of sails, etc.....	59
Strandings.....	82
<i>Inland Vessels.</i>	
Collisions.....	7
Foundering.....	10
Miscellaneous accidents.....	1
Strandings.....	15

STATEMENT of investigations into wrecks and casualties which occurred to Canadian, British and Foreign vessels, held during the fiscal year 1919-1920.

Name of Ship and Official Number.	Registered Port.	Remarks.
Albatross.....	(Portuguese).....	On March 9 was wrecked off Long Island, Nova Scotia, and two lives were lost. Preliminary inquiry was held at Hali'ax on March 14 before Captain. W. F. Mitchell. <i>Finding.</i> —Vessel was needlessly thrown away.
Admiral Hastings.....	(British).....	On August 22, stranded on Bagot bluff, gulf of St. Lawrence. Formal investigation was held at Sydney, on September 5, before Captain L. A. Demers, Dominion Wreck Commissioner, assisted by Captains A. J. Morrison and O. C. Lewis, acting as nautical assessors. <i>Finding.</i> —Error of judgment on part of master Frank Dudley. On account of his previous good record, his certificate is not dealt with, but he is cautioned.
Bohemian..... 113400	Liverpool, G.B.....	On March 1 stranded near Sisters rock, Sambro ledges, N.S., and six lives were lost. Formal investigation was held at Halifax, on March 5 and 6, before Captain J. B. Henry, assisted by Captains Neil Hall and C. O. Allan, acting as nautical assessors. <i>Finding.</i> —Master Ernest C. Hiscoe at fault for not having taken soundings. His certificate is suspended for four months.
Corcoran..... and Champion..... 103975	(American)..... Quebec.	On June 2, collided off island of Orleans. Formal investigation was held at Quebec, on June 30 and July 4, before Captain L. A. Demers assisted by Captains Chs. Lapierre and C. J. Stuart, acting as nautical assessors. <i>Finding.</i> —SS. <i>Champion</i> alone to blame for collision. Both master and first mate in default. Certificate of Donat Lemay, Master, and is suspended for six months, that of Alcide Gagne, 1st Mate, for three months.
Chebucto (Ferry)..... 108683	Halifax.....	On June 9 injured Halifax dock, through negligence on part of SS. <i>Hippolyte</i> . Formal investigation was held at Halifax, on July 30, before Captain L. A. Demers, assisted by Captains Neil Hall and Jos. Blois, acting as nautical assessors. <i>Finding.</i> —Damage to dock caused by SS. <i>Hippolyte's</i> presence in close proximity to the ferry and the entrance to her landing place. Master Jas. A. Crouse is severely reprimanded.



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## STATEMENT of investigations into wrecks and casualties which occurred to Canadian, British and Foreign vessels, held during the fiscal year 1919-1920—Continued.

Name of Ship and Official Number.	Registered Port.	Remarks.
Caddo.....	(American).....	On June 15 stranded at Isle aux Basques, St. Lawrence river. Formal investigation was held at Montreal, on July 21, before Captain L. A. Demers, assisted by Captains Chs. Lapierre and C. J. Stuart, acting as nautical assessors. <i>Finding.</i> —Pilot Phileas Lachance responsible for accident, in not adopting precautionary measures in foggy weather. He is severely reprimanded and cautioned.
Courcelette..... 128068	Quebec.....	On August 8 stranded on Seal rock. Formal investigation was held at Quebec, on September 18, before Captain H. St. Geo. Lindsay, assisted by Captains J. F. Robinson and W. E. Mitchell, acting as nautical assessors. <i>Finding.</i> —Master Joseph Delisle to blame, as he failed to use either good judgment or ordinary care in navigating his vessel so close to a lee shore. His certificate is suspended for three months.
Captain Dan..... 141373	Montreal.....	On August 22 collided with breakwater and sank in Quebec harbour. One life was lost. Formal investigation was held at Quebec, on August 25, before Captain L. A. Demers, assisted by Captains Chs. Lapierre and C. J. Stuart, acting as nautical assessors. <i>Finding.</i> —Master J. B. Camache in default for lack of judgment. His certificate is suspended for two months. Pilot Eudors Langlois did not exercise proper judgment in bringing ship so close to breakwater, and showed marked indifference in issuing orders for course. His license is suspended for four months. Mate Tremblay is severely reprimanded for not having rendered immediate assistance to the women and launching the boats. No one responsible for the loss of life, which was accidental.
Cape Breton..... 97808	Montreal.....	On April 5 damaged by explosion on board, while at Cape Spear, Nfld. Formal investigation was held at Sydney, on September 25, before Captain L. A. Demers, assisted by Captains C. M. Crockett and Geo. Symington, acting as nautical assessors. <i>Finding.</i> —No one to blame; accident due to the weakening of the patch on the centre furnace and bottom of combustion chamber, through corrosion.
Canadian Volunteer..... 141424.	Montreal.....	On December 8 stranded in Cap au la Roche channel. Formal investigation was held at Montreal on December 22, before Captain L. A. Demers, assisted by Captains Chs. Lapierre and C. J. Stuart, acting as nautical assessors. <i>Finding.</i> —No one to blame; accident due to uncontrollable circumstances, ice and snow contributing to neutralize the pilot's knowledge and efforts.
Chelston..... 119444	Glasgow.....	On September 12 stranded on St. Paul island, Cape Breton. Formal investigation was held at Montreal on October 9, before Captain L. A. Demers assisted by Captains Chs. Lapierre and C. J. Stuart acting as nautical assessors. <i>Finding.</i> —Accident due to grave error of judgment on part of Master A. M. Fotheringham. His certificate is suspended for three months.
Glenholm.....	(Canadian).....	On August 22 stranded on Goose Tongue rock, Spencer's island, N.S. Formal investigation was at St. John on September 9, before Captain L. A. Demers, assisted by Captains A. J. Mulcahy and O. C. Lewis, acting as nautical assessors. <i>Finding.</i> —Error of judgment on part of Master H. W. Moore. He is severely reprimanded, but, on account of his previous good record, his certificate is not dealt with.
Gladys H. (barge)..... and Eric W..... 116815	Montreal.....	On July 12 the <i>Eric W.</i> caused the <i>Gladys H.</i> to collide with the C. P. R. bridge in Lachine canal. Formal investigation was held at Montreal on October 9 and 10, before Captain L. A. Demers, assisted by Captains Chs. Lapierre and C. J. Stuart, acting as nautical assessors. <i>Finding.</i> —Master of <i>Eric W.</i> , J. Theo. Marchand, violated Art. 29 of Rules of the Road for the Great Lakes. His certificate is suspended for one month.
Germanicus.....	(British).....	On Nov. 7 stranded on Biquette island, St. Lawrence river. Formal investigation was held at Montreal on November 21, before Captain L. A. Demers, assisted by Captains C. J. Stuart and Chs. Lapierre, acting as nautical assessors. <i>Finding.</i> —Master John Clive incapable to administrate or exercise vigilance, having indulged in intoxicating liquors. His certificate as Master is cancelled, but Court recommends that a Mate's certificate be granted him.
Huronie..... 107168	Collingwood, Ont..	On August 15 stranded on Angus island, lake Superior. Formal investigation was held at Sarnia on September 17, before Captain L. A. Demers, assisted by Captain Peter McIntyre and Captain Ben. Garvie, acting as nautical assessors. <i>Finding.</i> —Error of judgment on part of Master, E. Walkinshaw, and his certificate is suspended for one month.
Hendrick Lund..... 21—5½	(Norwegian).....	On March 6 stranded at Dartmouth, N.S. Preliminary inquiry was held at Halifax on March 9, before Captain W. F. Mitchell. <i>Finding.</i> —Accident due to anchor dragging.



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STATEMENT of investigations into wrecks and casualties which occurred to Canadian, British and Foreign vessels, held during the fiscal year 1919-1920—*Concluded.*

Name of Ship and Official Number.	Registered Port.	Remarks.
Lake Frolena.....	(American).....	On August 6 stranded near Pointe du Chene, Northumberland strait. Formal investigation was held at Quebec on August 19, before Capt. L. A. Demers, assisted by Captains Chs. Lapierre and C. J. Stuart, acting as nautical assessors. <i>Finding.</i> —Pilot, Norbert Arcand, responsible for accident. His license is suspended for one month.
Lakeport..... and Howard W..... 133821	(American)..... Montreal.....	On October 29 collided near Hamilton's Light, Coteau lake. Formal investigation was held at Montreal on December 16 and 17, before Captain L. A. Demers, assisted by Captains J. A. Ouellette and Chs. Lapierre, acting as nautical assessors. <i>Finding.</i> —Howard W. alone to blame for collision. Certificate of Mate, L. J. Daigneault, suspended for seven months, for failure to comply with Rule 25 of Great Lakes Rules of the Road, and lack of judgment and prudence. Master L. Daigneault warned not to absent himself from bridge, in future, at crucial periods.
Manxman..... 938255	Montreal.....	On Dec. 18 foundered in Lat. 41-53 N, long. 59-31 W, North Atlantic and forty-three lives were lost. Preliminary inquiry was held at New York by the British Consul. <i>Finding.</i> —Accident due to heavy weather.
North Star.....	(American).....	On August 8 stranded near Yarmouth, N.S. Formal investigation was held at Yarmouth on August 4, before Captain L. A. Demers assisted by Captains E. E. Tedford and R. W. Goudey, acting as nautical assessors. <i>Finding.</i> —Captain Lewis F. Strout in default for careless navigation. Copy of finding forwarded to American Consul at Yarmouth, for action, if necessary.
Rio Negro..... 143303	London.....	On November 17 stranded near Pointe des Monts, St. Lawrence river. Preliminary inquiry was held at Quebec on November 20, before Captain H. St. George Lindsay. A formal investigation ensued, being held also at Quebec on December 3, before Captain L. A. Demers, assisted by Captains Chs. Lapierre and C. J. Stuart, acting as nautical assessors. <i>Finding.</i> —First Officer Alfred Hodder lacked in judgment by resuming his course without making himself positive of the nature of the light. His certificate is suspended for three months. 2nd Officer David Davies in default for disobeying instructions. His certificate is suspended for three months.
Scotia..... 111875.	Ottawa.....	On May 16 stranded at Mulgrave, N.S. Formal investigation was held at Mulgrave, on July 11th, before Captain L. A. Demers, assisted by Captains J. B. Scott and E. Smith, acting as nautical assessors. <i>Finding.</i> —Master, Geo. Cresine, erred in judgment in proceeding on when he failed to hear the fog-horn from Mulgrave, especially in view of the fact that there was a very strong tide and dense fog.
War Toronto.....	(British).....	On May 1 stranded on Hertel island, Montreal harbour. Formal investigation was held at Quebec on May 9th, before Captain L. A. Demers, assisted by Captains Chs. Lapierre and Chd. Koenig, acting as nautical assessors. <i>Finding.</i> —No one to blame: accident due to unforeseen happening.
War Beryl..... 143057 and Beaujeu (dredge).	London.....	On May 21 collided near Crane Island, river St. Lawrence. Formal investigation was held at Quebec on May 27 and 28, before Captain L. A. Demers, assisted by Captains Chs. Lapierre and Alf. Hope, acting as nautical assessors. <i>Finding.</i> —War Beryl mainly to blame. Master, Robt. McKillop, erred in judgment by being absent from the bridge when navigating in narrow channel. He is cautioned. 1st Officer, H. A. Moore, is also cautioned. Pilot Joseph Delisle gravely erred in judgment in not reducing speed. His license is suspended for four months. Master of dredge Beaujeu, A. Bourget, is severely reprimanded or not having had an officer and a watchman on duty. Captain Hope, assessor, is dissident.
Waybausnene..... 112336, and Long Sault..... 126853	Collingwood, Ont.. Quebec.	On May 16 damaged in collision with SS. Saguenay, in Sorel harbour. Preliminary inquiry was held at Quebec on July 18 and at Sorel on July 22, before Captain L. A. Demers. <i>Finding.</i> —Handling of barge Waybaushene not done in seaman-like manner.
War Witch..... and Gallia.....	(British)..... (French).....	On August 7 collided in lat. 46-22' N., long. 55-35' W., North Atlantic, resulting in the sinking of the Gallia and loss of 19 lives. Formal investigation was held at Halifax on August 12 and 13, before Captain L. A. Demers, assisted by Captains O. E. Lewis and A. J. Morrison, acting as nautical assessors. <i>Finding.</i> —War Witch to blame for collision. Master and 2nd Mate in default. Certificate of Master William B. Bennett is cancelled, but Court recommends that he be granted a Mate's certificate. Certificate of 2nd Mate, Christopher Carroll, is suspended for a year.



## SESSIONAL PAPER No. 21

## STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1919.

## COASTING AND SEA GOING WRECKS.

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years.	Registered Port.	How rigged. Iron or wood. Steam or sail.	Register tonnage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master.	Lives lost.	Loss. Total or Partial
Jan. 28.....	Alicante..... 138385	2	Lunenburg, N.S.....	Schr..... Wood	100	Barbadoes..... Lahave, N.S.	Lat. 29° 13' N..... Long. 61° 41' N. Atlantic.	Damaged in gale.....	.....	Partial loss
May 1.....	Acadia..... 112126	16	Lunenburg, N.S.....	Sail.....	91	Halifax..... Cushing Nfld.	George island..... Halifax harbour.	M. Romkey. Collided with <i>Alfredo</i> ..	.....	Partial, \$1,500.
June 7.....	Albert J. Lutz..... 121818	11	Halifax.....	Sail.....	95	Rose Blanche, Nfld..... Catalina, Nfld.	6 miles S.E. of Cape Broyle, Nfld.	W. White. Foundered.....	1	Total loss.
July 27.....	Admiral Knight..... 214059	3	Tacoma, Wash.....	Schr..... Wood	348	Seattle, Wash..... Ketchikan, Ala.	Sand Heads Light, Gulf of Georgia.	J. Jackson. Burnt.....	.....	Total loss.
Aug. 14.....	Authentic..... 140875	1	Liverpool, N.S.....	Steam Schr.....	22-71	Liverpool, N.S..... Liverpool, N.S.	Off Liverpool.....	Stranded..... R. E. King.	.....	Total, \$6,000.
Aug. 22.....	Admiral Hastings..... 143329	1	W. Hartlepool, Eng.....	Wood.	1,903	Montreal..... Great Britain.	Bagot Bluff, Anticosti..	Stranded.....	.....	Partial.
Sept. 15.....	Audrey A..... 138034	3	Barrington Passage, N.S.	Wood. Gas.	10-28	Barrington, N.S..... Fishing.	20 miles S. of Cape Sable	Abandoned..... J. A. Stewart.	.....	Total, \$1,000.
Nov. 4.....	Alice..... 103206	21	Liverpool, N.S.....	Schr..... Wood	42	Halifax..... Sheet harbour, N.S.	Entrance Jeddore harbour.	Stranded..... F. Walsh.	.....	Total: Ship, \$800. Cargo, \$800.
Nov. 5.....	Audrey P. Brown..... 141383	1	Lahave, N.S.....	Sail.....	218	Lahave, N.S.....	Liverpool Bay, N.S.....	Stranded..... R. M. Brown.	.....	Partial, \$5,000
Nov. 14.....	Annie Corby..... 107209	19	Digby, N.S.....	Sail.....	71	Metagan, N.S..... Boston, Mass:	Island Point Buoy, N. Atlantic.	Collided with <i>Ranson Fuller</i> .	.....	Partial.
Nov. 19.....	Arabia..... 11750	17	St. Johns, Nfld.....	Schr..... Wood	80-09	Fortune, Nfld..... Gallouse, Nfld.	Little Round Shoal, St. Peters Bay, N.S.	A. Thibaudeau. Stranded.....	.....	Total.
Nov. 20.....	Annie B. Anderson..... 138474	2	Parrsboro, N.S.....	Sail.....	465-94	Triza, Spain..... Gibraltar.	Lat. 42° 20' N..... Long. 63° 30' W. N. Atlantic..	Loss of sails..... E. H. Kirby.	.....	Partial, \$2,000.
Dec. 4.....	Arammore..... 98579	30	Ottawa.....	Schr..... Iron	502	Charlottetown, P.E.I..... Labrador.	Between Wolf and Comchbacks Bay	Stranded..... D. M. Macdonald.	.....	Partial.
Dec. 20.....	Aquadilla..... 111641	17	Lunenburg, N.S.....	Schr..... Wood	99	Fortune, Nfld..... Lamaline, Nfld.	Island, Can. Labrador Lamaline.....	Stranded..... C. E. Bennett.	.....	Total, \$5,000.
June 5.....	Bedeque..... 126035	11	Liverpool, N.S.....	Schr..... Wood	34	Port Hawkesbury, N.S. Port Hawkesbury, N.	Madam Island, N.S.....	Foundered..... T. H. Boudrot.	.....	Total, \$5,000.
Sept. 12.....	B. L. Rafuse..... 141134	1	Lahave, N.S.....	Schr..... Wood	480-51	Guadeloups..... Bordeaux.	20 miles S. of Sombbrero Light, W.I.	Burnt..... J. H. Richard.	.....	Total.



STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1919.—*Continued.*

COASTING AND SEA GOING WRECKS.

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years.	Registered Port.	How rigged. Iron or wood, Steam or sail.	Register. Tonnage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master.	Lives lost.	Loss. Total or Partial.
Oct. 6	B. B. Hardwick. 100018	22	Annapolis, N.S.	Sail...	123	Bridgewater, N.S. Trinidad.	Lat. 41°10' N. Long. 47°29' W. N. Atlantic.	Foundered... H. C. King.	.....	Total.
Nov. 2	Bennett C. 126393	10	Lunenburg, N.S.	Sail...	105	Cook's Harbour, N.S. Gibraltar.	Lat. 35°57' N. Long. 06°27' W. N. Atlantic.	Foundered... P. Yarn.	.....	Total.
Nov. 28	Bassa... 142341	1	London.	Schr... Steel Steam	3,202	Montreal... Capetown.	Montreal harbour	Stranded Jas. Smith.	.....	Partial, \$40,000.
Dec. 8	B. C. Maid... 134076	26	Vancouver	Tug... Wood Steam	26-44	Vancouver. Mill Creek, B.C.	Mill Creek.	Foundered... J. M. Johnson.	.....	Total.
Dec. 14	Barbara Macdonald... 141234	.....	Charlottetown, P.E.I.	Steam	2,624	South Shields, Sydney, N.S.	N. Atlantic.	.....	.....	Partial, \$5,000.
Dec. —	Borussia...	.....	.....	Steam	63	Yarmouth, N.S. Fishing.	Petit Passage, N.S.	Steering gear damaged..	.....	Partial, \$5,000.
Jan. 10	Curlew... 103181	21	Barrington Passage, N.S.	Schr... Wood Sail	.....	.....	.....	Stranded David Alwood.	.....	Total.
Mar. 21	Cape Lahave... 141136	1	Lahave, N.S.	Sail...	363	Liverpool, N.S. Barbadoes.	Lat. 33°32' N. Long. 58°42' W. N. Atlantic.	Sprung a leak... E. Sarty.	.....	Total.
April 5	Cape Breton... 97808	27	Montreal...	Schr... Steel Steam	1,761	St. Johns, Nfld. Louisburg, N.S.	Cape Spear, Nfld. Coast.	Boiler explosion... S. E. Macdonald.	5	Partial.
May 17	Crescent... 100345	16	Maitland, N.S.	Schr... Wood Sail	99	Windsor, N.S. Barbadoes..	Digby Gut, Annapolis River, N.S.	Damaged in gale... A. Gray.	.....	Partial, \$400.
June 9	Chebucto... 108683	23	Halifax...	Ferry... Steel Steam	260	Halifax... Dartmouth.	Halifax harbour...	Collided with pier... M. Murphy.	.....	Partial.
.....	Charlevoix... 107563	20	Bridgetown, Bdoes...	Schr... Wood Sail	427	.....	Lat. 28°09' N. Long. 79°07' W. N. Atlantic.	Abandoned.....	.....	Total.
June 13	Crescent... 100345	16	Maitland, N.S.	Schr... Steel Steam	99	Windsor... Barbadoes.	Lat. 41°33' N. Long. 66°08' W. N. Atlantic.	Sprung a leak... A. Gray.	.....	Partial.
June 16	Craftman... 106816	21	Liverpool.	Schr... Steel Steam	4,030	Liverpool... Montreal.	Lat. 46°31' N. Long. 54°23' W. N. Atlantic.	Collided with iceberg. G. C. Green.	.....	Partial.
June 26	Corcoran... 218058	1	(American)	Schr... Steel Steam	1,280	Montreal... St. Nazaire.	Abreast of Lauzon, Que	Collided with <i>Champion</i> J. Bergsten.	.....	Partial.



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June	26	Champion. 103975	21	Quebec.	Steam.	304	Quebec. Ste.-Petronile, Island of Orleans.	Abreast of Lauzon.....	Collided with <i>Corcoran</i> Donat Lemay.	.....	Partial.
June	27	Coureclette. 138068	23	Ottawa.	Schr.... Wood Steam	62	Quebec. Quebec.	Seal Rock, Bay des Chaleurs.	Stranded Jos. Delisle.	.....	Partial.
Aug.	22	Captain Dan.....	37	Montreal.....	Steam.....	710-60	Port au Saumon Ogdensburg.	Quebec harbour.....	Collided with break- water. J. B. Camache.	1	Partial.
June	15	Caddo.....	.....	(American).....	.....	.....	.....	Isle au Basque, St. Lawrence river.	Stranded A. M. Fotheringham.	.....	Partial.
Sept.	12	Chelston. 119444	16	Glasgow.....	Steam Schr.... Steel Steam.	2,389	.....	St. Paul Island, N.S....	Stranded	.....	Total.
Sept.	19	Cape Horn. 141210	1	Vancouver.....	Steam.....	1,184	.....	River Thames.....	Damaged by fire J. E. Ritchie.	.....	Partial.
Sept.	29	Celina K. Goldman. 138592	1	St. John, N.B....	Schr.... Wood Sail	477	Parrsboro, N.S. New York	Protero Bay, Uruguay	Stranded C. A. Trefrey.	.....	Total.
Oct.	12	Camosun. 121204	14	Vancouver.	Schr.... Steel Steam	793-72	Vancouver. Prince Rupert.	8 miles W. by N. $\frac{1}{2}$ r. from York Pt.	Rudder damaged. A. E. Dickson.	.....	Partial.
Oct.	17	Canadian Trooper. 141431	1	Montreal.....	Steam.....	1,952-52	Vancouver. Montreal.	Lat. 51°04' N..... Long. 29°51' W. N. Atlantic.	Engines damaged. R. J. Fisher.	.....	Partial.
Oct.	26	Cape Pabos. 141196	1	Vancouver.	Steam.....	1,183-64	Hartlepool. Montreal..... London.	Robin Hood's Bay.....	Stranded A. Theriault.	.....	Total.
Dec.	8	Canadian Volunteer. 141424	1	Montreal.....	Steam.....	1,910	Montreal. London.	Cap a la Roche, St. Lawrence river.	Stranded E. E. Sears.	.....	Partial.
Dec.	10	Carmania..... 129901	14	Liverpool.....	Steam.....	9,981	Liverpool. New York.	Lat. 45°43' N..... Long. 52°05' W. N. Atlantic.	Collided with <i>Maryland</i> G. W. Nelson.	.....	Partial.
Dec.	13	Caledonian..... 113363	19	Liverpool.....	Steam.....	3,210	Boston..... Manchester via Louis- burg.	Off Halifax.....	Cargo damaged by fire T. B. Jago.	.....	Partial.
Dec.	16	Canadian Spinner. 141481	1	Montreal.....	Steam.....	3,330	Montreal. Halifax.	River and Gulf St. Law rence.	-Caught in ice..... J. M. Ruth.	.....	Partial.
Dec.	20	Canadian Recruit. 141366	1	Montreal.....	Steam.....	1,451	Montreal. West Indies.	Vaches Point, St. Law- rence river.	Stranded Peter J. Murphy.	.....	Partial.
Dec.	24	County of Richmond.. 138404	1	Sydney, N.S.....	Steam.....	245	Burgeo, Nfld. Oporto.	Lat. 42°40' N..... Long. 31°45' W. N. Atlantic.	Damaged in gale. L. Hare.	.....	Partial: Ship, \$500. Cargo, \$1,000. Total.
Jan.	29	Delbert D..... 126806	9	Liverpool, N.S....	Schr.... Wood Steam	16-41	Halifax. Liverpool, N.S.	Off Port Medway, N.S..	Stranded Jas. McLeod.	.....	Total.
Aug.	8	D.W.B..... 88418	35	St. John, N.B....	Schr.... Wood Sail	124	Paseagoula... Barbadoes.	Barbadoes, Carlisle Bay	Stranded F. W. Clarke.	.....	Total.
Sept.	16	Daisy..... 92584	29	Charlottetown, P.E.I	Sail.....	69-71	Boston..... Summerside, P.E.I.	Northumberland Strait.	Foundered. A. J. Moran.	.....	Total.
Oct.	14	Douglas Adams 116540	12	Halifax.....	Sail.....	99-23	Twillington Malaga.	Newfoundland... Banks.	Damaged in gale. N. Goose.	.....	.....
Oct.	15	Dorothy Earl.. 138741	1	Yarmouth, N.S..	Schr.... Wood Gas	37-21	Yarmouth. Fishing.	Chebogan Point, N.S...	Stranded H. Seeley.	.....	Partial, \$500.
Nov.	7	Dorothy Adams. 134406	5	Lunenburg, N.S...	Schr.... Wood Sail	92	.....	Kaulback's Head, N.S..	Stranded	.....	Slight damage.
Dec.	18	Dartmouth. 90889	32	Halifax.....	Ferry..	196	Halifax. Dartmouth, N.S.	Halifax harbour.....	Collided with <i>Transport</i> <i>Pacific</i> .	.....	Partial.



STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1919.—*Continued.*

COASTING AND SEA GOING WRECKS.

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years.	Registered Port.	How rigged. Iron or wood. Steam or sail.	Register- tonnage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master.	Lives lost.	Loss. Total or Partial.
Feb. 16	Ella L. Williams... 141138	1	Lahave, N.S.	Schr... Wood Sail	374	St. John, N.B. Barbadoes.	Lat. 37°58' N. Long. 63°24' W. N. Atlantic.	Damaged in gale... W. D. Stearn.	.....	Partial.
April 21	Eva June... 166518	15	Lunenburg, N.S.	Sail...	93	St. Kitts, B.W.I. Halifax.	Halifax harbour...	Stranded... A. H. Gibson.	.....	Partial.
May 14	Enterprise... 94659	32	Lunenburg, N.S.	Sail...	69-83	Charlottetown, P.E.I.	Off Entry island, Gulf St. Lawrence.	Foundered... Frank Smith.	.....	Total, \$2,500.
June 30	Etherington... 141082	1	Shelburne, N.S.	Schr... Wood. Gas	28	Port Elgin, N.B. Yarmouth.	Swansea's Cove, N.S.	Burnt... L. Messenger.	.....	Total.
July 7	Empress of Britain... 120940	13	Liverpool...	Schr... Wood Steam.	8,025	Liverpool... Quebec.	Lat. 48°56' N. Long. 45°04' W. N. Atlantic.	Cargo damaged by fire... G. S. Webster.	.....	Partial.
Aug. 21	Elmer Roberts...	.....	.....	.....	.....	.....	Lat. 41°05' N. Long. 62°18' W. N. Atlantic.	Burnt...	.....	Total.
Sept. 6	E. O. Pratt... 36906	26	Whitehall, N.Y.	Schr... Wood Steam	103	Quebec.	Quebec harbour...	Sprung a leak... H. Shavah.	.....	Partial.
Nov. 29	Eagle No. 58...	1	Washington.	Steel Steam...	500	Detroit, Mich. Quebec.	Ste. Therese island, St. Lawrence river.	Stranded... C. Wait.	.....	Slight damage.
Dec. 12	K. Kinsley...	1	Vancouver.	Steel Steam...	541	Montreal... Halifax.	Entrance Whitehaven harbour, N.S.	Stranded... H. M. Uldall.	.....	Slight damage.
Dec. 18	Edward A. Cotan... 141520	1	Parrsboro, N.S.	Schr... Wood Sail	597	No. Sydney, N.S. St. Louis du Rhone, France.	Lat. 44°47' N. Long. 50°30' W. N. Atlantic.	Damaged in gale... W. M. Collins.	.....	Partial.
Dec. 25	Emilienne Burke... 122884	10	Charlottetown, P.E.I.	Sail...	89	N. Sydney, N.S. St. Pierre Miquelon.	15 miles W. of St. Pierre	Damage d in gale...	.....	Partial, \$250.
Jan. 7	Flavella...	17	Boston, Mass.	Schr... Wood Aux.	26	Boston... Liverpool, N.S.	Liverpool, N.S.	E. Seeley. Stranded	.....	Partial.
May 9	Falka... 130734	8	Lunenburg, N.S.	Schr... Wood Sail	100	St. John, N.B. Oporto.	Lat. 44°30' N. Long. 34°00' W. N. Atlantic.	U. H. Goodwin. Damaged in gale... J. Edgecomb.	.....	Partial.
Aug. 25	Frances A... 121572	13	Yarmouth, N.S.	Sail...	91-90	Yarmouth, N.S. Fishing.	125 miles S.E. of Halifax	Sunk in collision with Lord Devonshire.	6	Total.
Nov. 20	Francisca... 132209	9	Hull, Eng.	Schr... Steel Steam.	4,745	Hull, Eng. Hull, Eng.	Lat. 41°46' N. Long. 58° W. N. Atlantic.	H. A Amiro. Damaged by fire... J. Wilkins.	.....	Partial, \$30,000.
Sept. 22	F. J. Waffle... 130767	.....	Kingston...	.....	.....	.....	Between Oswego and Ducko island.	Foundered...	6	Total.



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Dec.	16.	F.L.B. 3.	2	Vancouver.	Scow.	365-43	Prince Rupert.	Prince of Wales island, Alta.	Stranded R. W. McNeil.	Total.
Feb.	19.	Gray.	10	Workington.	Wood Steam.	280	Point Ellice.	Point Ellice.	Cargo damaged by fire W. F. Billington.	Part.
Feb.	24.	Geo. Melville	1		Schr.	820	Parrsboro, N.S.	Lurcher's Lightship, N. Atlantic.	Foundered Art. Conrad.	Total.
June	5.	Geneva Ethel.	25	Barrington N.S.	Wood Sail	29	Sydney, N.S.	Lennox Passage.	Stranded J. Decoste.	Partial, \$60.
July	19.	Governor Cobb.	13	Boston, Mass.	Sail.	1,999	Boston, N.S.	Off Yarmouth.	Stranded A. W. Hall.	Partial.
Aug.	21.	Glen Allen.	7	Ottawa.	Schr.	112	Quebec.	St. Nicholas, St. Lawrence river.	Stranded Art. Gagnon.	Partial, \$1,000.
Aug.	26.	Giffin.	5	Vancouver.	Comp Steam		Vancouver.	Opposite Prospect Point, Burrard Inlet.	Collided with <i>Ida G.</i> G. McMillan.	Slight damage.
Aug.	22.	Glenhole.			Wood.. Gas		St. John, N.B.	Goose Tongue Rock, Spence's island, N.S.	Stranded H. W. Moore.	Partial.
Oct.	14.	General Horne.	1	Shelburne, N.S.	Steel Steam	179	Grand Banks, Nfld. Oporto.	Lat. 44°38' N. Long. 40°00' W. N. Atlantic.	Damaged in gale. B. Rogers.	Partial: Ship, \$400. Cargo, \$7,500.
Nov.	7.	Germanicus.		(British)	Schr.	2,623	Great Britain.	Biquette island. St. Lawrence river.	Stranded and abandoned John Clive.	
Nov.	14.	Gilbert Island.	4	Liverpool, N.S.	Steel Steam	245-29	Liverpool.	Viti Levu, Fiji Islands.	Stranded Wm. Robertson.	Partial.
Nov.	15.	Geo. S. Smith.	4	Boston.	Wood Sail	495	Quebec.	Two miles W. of Pointe des Monts, St. Lawrence river.	Stranded C. Chelin.	Total.
Nov.	29.	General Turner.	1	Toronto.	Schr.	1,877	Toronto.	Gibraltar Bay.	Collided with <i>Innerton.</i> D. Jackson.	Partial.
Nov.	—	Crelstone.			Steel Steam		Newport, Eng. Halifax.	Off Sable island.	Propeller blades broken.	Partial.
Dec.	27.	Geraldine Wolvin.	2	Vancouver.	Schr.	1,259	Port Talbot.	Nantes harbour.	Collided with <i>Mariska.</i> Capt. Robinson.	Partial.
Dec.	—	Gatherer.	14	Lunenburg, N.S.	Wood Aux.	15	Bluff harbour.	Grindstone island, Magdalen Islands.	Stranded J. Stubbart.	Partial.
Jan.	3.	Haysport No. 1.	7	Vancouver.	Schr.	34	Prince Rupert.	Skidegate channel.	Stranded J. Anderson.	Slight damage.
Feb.	10.	Hazel E. Harmon.	2	Lunenburg, N.S.	Wood Gas.	134	Halifax.	Lat. 37°42' N., Long 61°35' W., N. Atlantic.	Damaged in gale. Arnold Parks	Part.
July	25.	Haysport No. 1.	7	Vancouver.	Wood Sail.	34	Vancouver.	Graham Island.	Foundered F. J. Wright.	Total, \$11,000.
Oct. Nov.	7.	Hornsec Holmen A. Frank.	1	Chatham, N.B.	Schr.	634	Gaspe.	Shediac Harbour, N.B. 40 miles SW. of Cape Canso, N. Atlantic.	Stranded Damaged in gale F. S. Innis.	Part. Part, \$3,000.



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COASTING AND SEA GOING WRECKS.

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Nov. 13	Hilda M. Strak. 138432	2	Annapolis Royal, N.S.	Schr... Wood Sail.	574	St. Andrews, Fla. Dakar, Africa.	Two days out from Flo- rida.	Sprung a leak. J. Turner.	.....	Part.
Dec. 27	Helen Mathers. 141087	1	Shelburne, N.S.	Schr... Wood Sail.	362	Boston, Mass. Cadiz, Spain.	Off Scilly Islands.	Damaged in gale. Art. Moore.	.....	Part.
Feb. 16	Impressive. 138648	1	Lahave, N.S.	Schr... Wood Sail.	381	Halifax Barbados.	Lat. 32°14' N. Long. 58°10' W. N. Atlantic.	Damaged in gale. H. Axner.	.....	Part.
Aug. 26	Ida C.	7	Vancouver	Wood Motor	17	Vancouver Vancouver.	Opposite Prospect Point, B.C.	Collided with <i>Giffin</i> . F. Gardner.	.....	Part, \$150.
Oct. 31	Island Princess. 138784	6	Victoria	Wood Steam.	205.80	Victoria Nanaimo.	Pent Island, Hornston Passage, B.C.	Stranded O. H. P. Rogers.	.....	Slight damage.
Jan. 22	James Carruthers. 138369	2	Vancouver	Schr... Wood Aux.	1,253	Tacoma Asaka, Japan.	Lat. 47°00' N. Long. 124°10' W. Pacific ocean.	Stranded W. Cairney.	6	Total.
Mar. 20	J. B. Young. 126584	9	Lunenburg	Schr... Wood Sail.	99.72	Lunenburg Liverpool, N.S.	Off Lunenburg	Stranded A. Hennalman.	.....	Part, \$4,000.
Mar. 27	Jason. 215863	30	New York	Steel Steam.	1,594	New York Havre.	Lat. 40°06' N. Long. 58°24' W. N. Atlantic.	Damaged in gale. W. H. Bevan.	.....	Part.
Jan. 23	J. E. Backman. 141191	1	Lahave, N.S.	Schr... Wood Sail.	394	Dieby Montevideo.	English Bank, River Platte.	Stranded Chs. Shrader.	.....	Part.
April 29	Julia B. Merrill. 126468	47	Kingston, Ont.	Schr... Wood Sail.	196	.....	Nine Miles point.	Stranded	.....	Part.
April 30	Jesse Hart II.	53	Calais, Me.	Schr... Wood Sail.	212 212	Eastport Apple river, N.S.	Apple river.	Foundered. E. B. Carter.	.....	Total, \$6,000.
June 10	J. B. Kitchen. 116914	45	St. John, N.B.	Schr... Wood Sail.	300.78	Halifax Ireland.	Lat. 43°25' N. Long. 50°40' W. N. Atlantic.	Foundered. D. McDonald.	.....	Total.
Oct. 22	J. H. Hackett. 111619	18	Montreal	Tug... Wood Steam	79.168	Montreal Montreal	St. Nicholas, St. Law- rence river.	Collided with <i>Rimouski</i> . W. Allison.	.....	Part.
Nov. 5	J. C. Williams 61592	43	Halifax	Schr... wood Gas.	28	Halifax Aricbat, N.S.	Ship Harbour, N.S.	Stranded A. J. Young.	.....	Total, \$1,500.



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Nov. 21	J. Miller 138640	1	Maitland, N.S.	Schr. Wood	355	St. John's, Nfld Patras, Greece.	Cape Papas, Greece.	Stranded. Jerry Petit.	Total.
Nov. 24	Joazeiro.		(Brazilian)	Schr. Sail		Montreal. Brazil, via Sydney, N.S.	Glace Bay, N.S.	Stranded	Part.
Dec. 21	James Slater. 138191	1	Lahave, N.S.	Schr. Steel	364-55	Liverpool. New York	Wellfleet, Cape Cod, Mass.	Stranded. J. L. Publicover.	Total, \$50,000.
Feb. 15	King Malcolm 90089	34	St. John's, Nfld	Schr. Wood	1,304	Louisburg. Halifax.	Entrance to Beaver har bour.	Stranded. Geo. Campbell.	Total, 50,000.
June 22	Knut Hamsun	12	Bergen, Norway	Schr. Iron	1,850	Skein, Norway. Hampton Beach, U.S.A.	Lat. 41° 56' N. Long. 48° 01' W.	Damaged in gale. P. Anderson.	Part.
Nov. 6	K. N. No. 1. 130701	8	Vancouver	Schr. Steel	105	Vancouver Union Bay.	N. Atlantic. SE. of Merry Island, B.C.	Stranded	Total. 1
Nov.	Kalemba			Schr. Wood		Mobile. Glasgow.	N. Atlantic	Damaged in gale.	Part, \$7,500.
Jan. 3	La Brea 213909	2	San Francisco.	Schr. Steel	4,276	California Vancouver.	Vancouver harbour.	Collided with <i>Africa Maru</i> .	Slight.
Jan. 151	Canadienne. 82778	38	Ottawa	Schr. Iron	227	Yarmouth, N.S. Yarmouth, N.S.	Elmswood Island, N.S.	Stranded. L. K. Livingston.	Part, \$500.
Feb. 28	Lord Dufferin 108624	21	Montreal.	Schr. Steel	300-78	Montreal. Montreal.	New York harbour.	Collided with <i>Aquitania</i>	Part..
April 16	Long Sault 126853	8	Quebec	Tug. Wood.	27,82	Sorel, P.Q. Sorel, P.Q.	Sorel harbour.	Collided with <i>Waubachene</i> F. Vezina.	\$1,200.
May 3	Lewis Brothe 138347	1	Halifax	Schr. Wood.	765	Boston. Barcelona.	Off India Point. Argentine.	Collided with <i>Mount J. W. Larkin</i> .	Part. \$20,000.
June 13	Lady Flushing			Schr. Sail.			Savage Harbour, P.E.I.	Stranded	Part.
June 29	Lorencia. 126485	10	Montreal	Schr. Steel	204,88	Montreal. Montreal.	Valleyfield.	Collided with <i>Robidour</i> J. O. Sicotte.	Part. \$125.
Aug. 6	Lake Frolona.	1	Lorain, Ohio.	Schr. Steel	1,613	Montreal. Piraeus.	Grondines, St. Lawrence river.	Stranded E. H. Hickey.	Part
Sept. 1	La Lorraine.		(French).	Schr. Steel		New York. Havre.	120 miles SSE of Hali- fax.	Collided with <i>Prom olin</i>	Part.
Sept 6	Lucien W. Robinson	7	Ogdensburg, N.Y.	Schr. Steel	1,141	Little Saguenay Ogdensburg.	Cap a la Roche, St Lawrence river.	Stranded. Henry Russell.	Part.
Oct. 25	Laberge. 138383	3	Lunenburg, N.S.	Schr. Wood	97	Fortune. Oporto.	Lat. 45° 10' N. Long. 51° 20' W.	Damaged in gale. Art. Carter.	Part: Ship, \$525. Cargo, \$8,000.
Nov. 30	Lake Mattato. 217183	2	Chicago	Schr. Sail.	1,441	Montreal. Quebec.	N. Atlantic. Quebec harbour.	Collided with gate, en- trance inner basin. T. Simmons.	Part.
Dec. 4	Lake Elmsmere. 219256	1	Ashtabula.	Schr. Steel	1,663	Cleveland. Boston	Quebec Bridge St. Lawrence river.	Stranded S. B. Cladulick.	Part.



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Dec. 4	Lake Fillion. .... 219277	.....	New Toledo, Ohio....	Schr..... Steel	1,586	Cleveland..... Bathurst	Horse Back shoal, St. Lawrence river.	Stranded..... L. F. Powell.	.....	Slight Damage.
Dec. 11	Lake Elmsdale..... 219201	1	Ecorce, Mich.....	Schr..... Steel	1,658	Montreal..... Halifax	Entrance Gut of Canso...	Stranded..... C. Clark.	.....	Part.
Dec. 18	Louise Maud..... 83402	38	Halifax, N.S.....	Schr..... Wood	21	Jeddore, N.S..... Halifax	12 miles off Halifax.....	Stranded..... G. Webber.	.....	Total: Ship, \$800; Cargo, \$150. Part.
Dec. 16	Lancastrian..... 99326	28	Liverpool.....	Schr..... Steel	3,325	Antwerp..... New York	100 miles E. of Halifax...	Damaged by fire..... W. F. Wood.	.....	Part.
Dec.	Laurel Whalen..... 138367	2	Vancouver.....	Schr..... Steel	1,048.56	Auckland, N.Z..... Vancouver	Tahite Islands.....	Damaged in gale..... H. Doherty.	.....	Part.
Dec. 11	Lake Galwood..... 219120	.....	(American).....	Schr..... Steel	1,672	Montreal..... New York	Port Hood island, N.S....	Stranded..... W. P. O'Brien	.....	Part.
Jan. 2	Margerey Austin..... 138594	1	St. John, N.B.....	Schr..... Wood	112	Alma, N.B..... St. John, N.B.	Near Applie Riverlight, N.S.	Stranded..... C. E. Brewster.	.....	Total: Ship, \$25,000. Cargo, \$2,300. Part., \$75,000.
Feb. 13	Magdalen..... 85405	13	Magdalen islands.....	F. & A..... Wood	92	Mulgrave, N.S..... Halifax	Dartmouth, N.S.....	Damaged by fire..... J. B. Scott.	.....	Total.
Feb. 14	Minnie C. Parsons..... 130154	3	Windsor, N.S.....	Schr..... Wood	.....	Torre vieja..... Santos	Torre vieja, Spain.....	Stranded.....	1	Total.
Feb. 15	Mulgrave..... 103042	26	Ottawa.....	F. & A..... Sail	320.67 330	Louisburg..... Halifax	Entrance Beaver harbour.	Stranded..... E. Ford.	.....	Total, \$100,000.
April 3	Maria Stalpatos.....	3	Ithaca, Greece.....	Schr..... Iron	2,291	Venice..... Quebec	Quebec harbour.....	Damaged by fire..... D. A. Karanas.	.....	Part, \$300.
Aug. 19	Matsqui..... 130459	8	Vancouver.....	Schr..... Wood	77	Vancouver..... Vancouver	Vancouver harbour.....	Collided with <i>Songhee</i> ..... J. Hunter.	.....	Slight damage.
Aug. 28	Melville Dollar..... 121212	13	Vancouver.....	Steel Steam	2,804	Vancouver..... Shanghai	Lat. 12°12' N..... Long. 120°44' E. Pacific ocean.	Steam pipe burst..... W. Wright.	6	Part.
Sept. 23	Mendip Range..... 135897	5	West Hartlepool.....	Schr..... Steel	2,840	London..... Quebec	Montreal harbour.....	Collided with coal barge..... E. E. Hewson.	.....	Part.



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Oct.	17.	Muriel B. Walters. 126113	11	Lunenburg, N.S.	Schr. Wood	98	St. Johns, Nfld. St. Johns, Nfld.	Lat. 45°29' N. Long. 39°50' W. N. Atlantic.	Abandoned. L. B. Dodman.	3	Total.
Nov.	9.	Merrimac. 74264	43	Sydney, N.S.	Schr. Sail	70-78	Halifax. Halifax.	Halifax harbour.	Foundered. Jacob Cruise.		Total, \$950.
Nov.	27.	Marion G. Douglas. 133899	2	Lahave, N.S.	Schr. Wood	449	Point Tupper.	North Atlantic.	Abandoned.		Total.
Dec.	6.	Mayflower. 116553	13	Maitland, N.S.	Schr. Sail	132	Parrsboro, N.S. Boston.	Five miles east of Mount Desert island, Me.	Sails damaged. D. Desmond.		Partial.
Dec.	15.	Melnorine. 138762	1	Halifax.	Schr. Wood	366-06	Lisbon, Portugal. Burgeo, Nfld.	Lat. 33°59' N. Long. 49°40' W. N. Atlantic.	Abandoned. M. Vatcher.		Total, \$100,000.
Dec.	16.	Marie Barnard. 138690	2	Vancouver.	Schr. Sail	97	Fortune. Oporto.	Lat. 45°10' N. Long. 51°20' W. N. Atlantic.	Damaged in gale. Art. Carter.		Partial, \$5,500.
Dec.	18.	Manxman. 938255	31	Montreal.	Wood Aux.	3, 122	Newport. Gibraltar.	Lat. 01°53' N. Long. 59°52' W. N. Atlantic.	Foundered. J. W. Burgess.	43	Total.
Dec.	27.	Mariska. 130979	29	Collingwood, Ont.	Steel Steam	1,872	Baltimore. Nantes.	Nantes harbour.	Collided with <i>Geraldine</i> <i>Wolvin</i> .		Partial, \$3,000.
Jan.	4.	Naiad. 122539	11	Vancouver.	Tug. Wood	31	Vancouver. Tucker bay.	Sabine Channel. B.C.	Stranded. P. Daveney. H. Lander.		Total, \$6,000.
June	24.	Newcastle No. 4. 138688	2	Vancouver.	Steam	15-15	Skeena river.	Kenatan island, B.C.	Stranded. U. Nishikawa.		Partial.
Aug.	8.	North Star. 130294	19	Boston.	Wood Gas.	1, 999	Boston. Yarmouth, N.S.	Green island, N.S.	Stranded. L. F. Strout.		Total.
Sept.	14.	Neilsons & Palmer.	24	Plattsburg, N.Y.	Wood Barge.	122	Whitehall, N.Y.	Quebec harbour.	Stranded. Wm. Reilly.		Total.
Sept.	20.	Nebo.		Halifax.	Wood Steam	450	Halifax. Sydney, N.S.	43 miles NW. from St. Pierre Miquelon.	Foundered. W. J. Cheverie.		Total.
Dec.	20.	Nile. 122311	11	Lunenburg, N.S.	Schr. Wood	34	Georgetown, P.E.I.	Off Capa George, N.S.	Foundered. Stanley Drane.		Total.
Jan.	8.	O. G. E. No. 1. 141989	6	New Westminster.	Barge. Wood	681	Vancouver. Squamish.	Off Prospect Point.	Collided with <i>Princess</i> <i>Patricia</i> .		Part.
Sept.	25.	Ossifrage. 107488	33	Halifax.	Steam Barge.	234-67	Wallace, N.S. Souris, P.E. I.	Northumberland Strait.	R. B. Stevens.		
Nov.	6.	Ocean Child. 83398	38	Halifax.	Wood Steam	19	Halifax. Halifax.	Halifax harbour.	Foundered. N. Pettipas.		Total, \$300.
April	13.	Prince John. 129472	9	Prince Rupert.	Schr. Sail	539	Vancouver. Prince Rupert.	Queen Charlotte Sound.	Stranded. W. S. Mulhouse.		Partial.
Aug.	8.	Princess Ena. 122387	12	Victoria.	Steel Steam	837-16	Vancouver. Quatsino.	Ripple rock, Discovery passage.	Stranded. Thos. Cliff.		Partial.
Sept.	3.	Promotion.	1	Lahave, N.S.	Wood Sail	187	Halifax. Fishing.	North Atlantic.	Sunk in collision with <i>La Lorraine</i> L. Corkum.		Total, \$300,000.



STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1919.—*Continued.*

COASTING AND SEA GOING WRECKS.

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years.	Registered Port.	How rigged. Iron or wood. Steam or sail.	Register Ton. nage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master.	Lives lost.	Loss. Total or Partial.
Dec. 8	Princess Charlotte 126236	11	Victoria	Schr... Steel	1,999	Victoria Vancouver.	Off Br Clinton Point B.C.	Collided with <i>Morning Star</i> .	.....	Slight damage.
Oct. 23	Prince Rupert 129743	9	Newcastle, Eng.	Schr... Steel	1,626	Seattle, Wash. Ocean Falls	Strait of Georgia.	Fire in cargo... D. Mackenzie.	.....	Partial.
Nov. 1	Paul.....	24	Hamburg, Germany.	Barque... Steel	1,968	Hamburg... Philadelphia	Lat. 45°41' N. Long. 22°18' W.	Damaged in Gale... Wm. Kruger.	.....	Partial, \$15,000.
Nov. 7	Polar Land... 216982	1	Baltimore	Steam F. & A....	2,501	New York Gibraltar.	N. Atlantic. Off Seatarie, N.S.	Foundered... W. B. Wheeler.	.....	Total.
Nov. 7	Plataea.....	21	Piræus, Greece	Steam Steel	2,044	Piræus... Montreal.	Sable island.	Stranded... John Kivitos.	.....	Partial.
Dec. 20	Quetay... 100657	28	St. John, N.B.	Schr... Wood	125	Weymouth. Boston.	Lat. 44°08' N. Long. 68°14' W.	Loss of sails... G. W. Brooks.	.....	Partial.
April 8	Rosedale... 95265	31	Hamilton	Sail F. & A.	977	Cardiff Bordeaux.	N. Atlantic. North Atlantic.	Collided with <i>Lulla</i> ... E. J. Namby	.....	Total.
April 19	Richard B. Silver... 138837	1	Lunenburg, N.S.	Iron. Steel	400-47	Buenos Ayres Havre.	Lat. 10°13' N. Long. 39°31' W.	Foundered... A. Zinek.	.....	Total, \$80,000.
June 15	Rock Ferry... 130419	37	Montreal	Schr... Wood	715-53	Quebec Chicoutimi	N. Atlantic. Off mouth of Bay of Rocks.	Stranded... W. A. Tullock.	.....	Partial.
July —	Raymond d'Or... 134737	7	Halifax	Steam Steel	90-55	Portland, Me Fishing.	Mud Island, N.S.	Stranded... H. M. Green.	.....	Partial.
Sept. 1	Rosalind.....	8	Liverpool	Steam Steel	1,336	New York Halifax.	Lat. 44°18' N. Long. 63°43' W.	Collided with <i>General Haig</i> .	.....	Partial.
Oct. 22	Rimouski... 140589	1	Liverpool	Steam Steel	3,719	Liverpool Quebec.	N. Atlantic. Lat. 45°43'10" N.	H. C. Mitchell. Collided with <i>J. H. Hackett</i> .	.....	Partial.
Oct. 28	Raeburn... 94796	26	Charlottetown, P.E.I.	Steam Wood	74	Sydney, N.S. Charlottetown.	Long. 71°24' W. Riv. St. Lawrence.	E. L. Trant. Stranded... W. Trenholm.	.....	Partial, \$200.
Oct. 29	Ramfontein... 138595	1	St. John, N.B.	Schr... Wood	799	Torrevecija, Spain Charlottetown. P.E.I.	Lat. 42°30' N. Long. 53° W.	Damaged in gale. J. F. Sueltys.	.....	Partial.



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Nov. 17.	Rio Negro. 143303	18	London	Schr. Steel	3,061	Newport, Eng. Montreal.	1 mile N., 36 E. from Pointe des Monts	Stranded. Henry Daniel.	Partial.
Nov. —	Rosie M. B. 116272	16	Halifax	Schr. Wood Sail	75		North Sydney, N.S.	Stranded	Partial.
Jan. 10.	Sadie No. 7. 133683	8	Victoria	Scow.	204.16	Victoria.	1 mile off Cloverpoint. Gulf of Georgia.	Stranded. M. Matheson.	Partial.
Feb. 10	St. Michel.	1	Toronto	Wood	1,663.77	Victoria	Off Cape Hatteras, N.	Damaged in gale.	Partial.
Feb. 26.	Sacony. 138412	2	Weymouth, N.S.	2 masts. Steel	33	New York. Shanghai. 4 St. Anns, Ia. New York.	Atlantic. South coast of Pines, Caribbean sea.	C. Coalfleet. Stranded	Total, \$160,000.
April 22.	Somme.		(French)	Schr. Wood Sail			Halifax harbour.	Stranded.	Slight damage.
May 16	Scotia No. 1. 22423		Halifax	Car ferry. Iron		Port Mulgrave. Point Tupper.	Mulgrave, N.S.	Stranded Geo. Creaine.	Partial.
Aug. 19.	Songhee. 130548	11	Vancouver	Steam	27	Vancouver.	Burrard inlet.	Collided with <i>Matsqui</i> . W. Holland.	Partial.
Sept. 17.	Southern Cross. 115710	39	Boston	Wood Gas	39	Quebec. Seven Islands.	Pointe a la Croix, Seven Islands.	Foundered J. B. Blouin.	Total.
Nov. —	Suffolk.			Schr. Wood Sail			Halifax harbour.	Damaged by fire	Partial.
Nov. —	St. Clair, Theriault. 141223	1	Weymouth, N.S.	—	347	New Zealand. Mayo, Cape Verde islds. Yarmouth, N.S.	On passage from Mayo to Yarmouth.	Damaged in gale. L. Pothier.	Partial, \$10,000.
Dec. 4.	St. Croix.		Boston	Schr. Wood Sail		Parrsboro, N.S. Boston.	Off Spencer's island.	Sprung a leak	Partial.
Dec. 12.	Sheba. 129326	7	Ottawa	Schr. Steel	1,341	Sydney, N.S. Clarenceville, Nfld.	Lat. 46°10' N. Long. 54° W.	Damaged in gale. J. C. Shaw.	Partial.
Jan. 11.	Tuckahoe. 216286	1	Camden, N.Y.	Steel F. & A.	1,929	New York. St. Nazaire, France.	N. Atlantic. N. Atlantic.	Sprung a leak. T. H. Laurent	Partial.
Feb. 12.	Turret Cape. 104283	24	Montreal	Steel 2 masts.	1,141	Louisburg, N.S. Havre, France	Lat. 44°46' N. Long. 49°03' W.	Damaged in gale. K. Marsters.	Partial.
June 28.	Tartar. 124355	13	Vancouver	Steam Tug.	59	Union bay. Union bay.	Mouth Fraser river.	Stranded W. W. Best.	Partial.
July 15.	Truro Queen. 141162	1	Parrsboro, N.S.	Steel Steam.	386	Buenos Ayres. Liverpool.	Manchester	Collided with gate. J. R. Marsh.	Partial.
Oct. 20.	Trowillard.			Schr. Wood Steam			Three miles below Bat- iscan, St. Lawrence river.	Stranded	Slight damage.
Nov. 21.	T. H. Macdonald. 138748	1	Yarmouth, N.S.	Bketc. Wood	1,335	Montevideo. Baltimore.	Off Tybee	Stranded G. L. Witmore.	Total.
Dec. 1.	Turret Court. 106608	23	Newcastle.	Schr. Steel	1,197	North Sydney, N.S.	N. Atlantic.	Damaged in gale.	Partial.
Dec. 11.	Verna D. Adams. 141043	1	Lunenburg.	Steam Schr. Wood Sail	98.95	North Sydney. Placentia, Nfld.	Ship Harbour Pt., Nfld	Stranded R. W. Bowers.	2 Total.



STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1919.—*Continued.*

COASTING AND SEA GOING WRECKS.

Date of Casualty.	Name of Ship. Official No.	Age of Ship. Years.	Registered Port.	How rigged. Iron or wood. Steam or sail.	Regis- ter Ton- nage.	Port sailed from. Port bound to.	Place where Casualty happened.	Particulars of Casualty. Name of Master.	Lives lost.	Loss. Total or Partial.
Feb. 1	William Duff. 133833	1	Lunenburg.	Sail.	265.07	Liverpool, N.S. Lunenburg, N.S.	Lat. 29° 0' N. Long. 69° 40' W. N. Atlantic.	Foundered. H. G. Corkum.	.....	Total.
Jan. 11	Win the War. 138198	2	Lahave, N.S.	Sail.	149	Lahave, N.S. Barbadoes.	Lat. 43° 0' N. Long. 63° 30' W. N. Atlantic.	Sprung a leak. A. Mosher.	.....	Partial.
May 1	War Toronto.	1	Toronto.	Schr. Wood Steam.	1,333	Toronto. Quebec.	Off Cap St. Michel. St. Lawrence river.	Stranded. A. J. Lowe.	.....	Partial.
May 21	War Beryl. 143057	.....	London.	Schr. Steel Steam.	4,094	Sunderland. Antwerp	Off Crane island, St. Lawrence river.	Collided with dredge <i>De Beaujeu</i> . R. McKillop.	.....	Partial.
Aug. 7	War Witch.	.....	(British).	Schr. Steel Steam.	1,145	Wabana, Nfld. Sydney, N.S.	Nfld coast. Lat. 46° 22' N. Long. 55° 35' W.	Collided with <i>Gallia</i> . W. P. Bennett.	19 from <i>Gallia</i> .	Partial.
Aug. 27	Wangaretta. 141910	1	Glasgow.	Schr. Steel Steam.	4,698	Montreal. New Zealand	Off Crane island, St. Lawrence river.	Fouled buoy 74. A. Horscroft.	.....	Partial.
Sept. —	Westmoreland. 137442	4	Liverpool.	Schr. Steel Steam.	862	Halifax	At sea.	Engines damaged.	.....	Partial, \$6,200.
Sept. 14	Warren G. Winters. 126120	11	Lunenburg, N.S.	Schr. Wood Sail.	95	Lahave, N.S. Sydney, N.S.	Fortune, Bay, Nfld.	Stranded. W. G. Rearley.	.....	Total, \$14,000.
Oct. 29	Wm. McL. Borden. 138655	1	Pictou, N.S.	Schr. Wood Sail.	335.71	Pugwash, N.S. Ayamonto Spn.	Off Ayamonto.	Burnt. R. C. Sheppard.	.....	Total.
Oct. 31	W. J. Carter.	.....	.....	.....	.....	.....	Yorkshire island.	Stranded.	.....	Partial.
Dec. 7	White Cliff. 130455	10	Vancouver.	Wood Gas	7.92	Vancouver. Longhorn Inlet.	Longhorn Inlet, B.C.	Foundered. L. A. Maloney.	.....	Total.
Dec. 12	Wesley.	.....	.....	.....	.....	.....	At sea.	Damaged in gale.	.....	Partial, \$6,000.
Nov. 24	Zeta. 112058	17	Windsor, N.S.	Steam Schr. Wood Sail.	335	France. Mobile. Berkinhead.	Near Cap Gris Nez, French coast.	Stranded. J. W. Hunter.	.....	Partial.



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INLAND WATERS WRECKS.

21-6	Nov.	—	A. McVittie... 138491	30	Montreal...	Schr. Steam	945	Kingston harbour...	Foundered...	.....	Total.
Aug.	21	Belleville...	138491	13	Montreal ..	Steel Steam	1,693	Near Lancaster Light, Lake St. Francis.	Stranded B. J. Sloan.	.....	Partial.
May	2	Columbian... 125947	122070	.....	Ordensburg, N.Y.	Wood Steam	1,053	Lachine canal...	Collided with Acadia... G. H. Kinch.	.....	Partial.
June	11	Canobie... 138826	125947	32	Montreal...	Wood Steam	1,051-39	Soulanges canal...	Collided with David W. Mills.	.....	Partial, \$1,500.
Oct.	28	Chicora... 53588	138826	55	Halifax...	—	540	Toronto harbour...	Foundered... L. Pregent.	.....	Partial.
Dec.	5	Condor... 92533	53588	31	Montreal...	Steam	566-69	Cornwall Canal.	Stranded J. Hebert.	.....	Partial: Ship, \$5,000. Cargo, \$5,000. Total.
May	26	Ferdinand Schlesinger 120481	92533	28	Duluth, Minn.	Wood Sail	2,081	15 miles SE. by E. of Passage island, Lake Superior, U.S.A.	Foundered...	.....	Total.
June	4	George King...	120481	45	Fairport, Ohio...	Wood Steam	380	Cote St. Paul, Lachine canal.	Collided with Marian W. W. F. Smith.	.....	Partial, \$500.
June	9	Glenilla... 138214	120481	16	Midland, Ont.	Steel Steam	3,401	Bottle Point, Lake Superior.	Stranded I. Tindall.	.....	Partial.
June	13	Geobic... 85977	138214	32	Duluth, Minn.	Wood Steam	1,213	Deadman's Rock, Lake Superior.	Stranded W. Quinlan.	.....	Total.
April	30	Henry B. Hall... 138094	85977	38	Montreal...	—	2,081	Lake Superior...	Foundered... O. Dyrness.	.....	Partial, \$5,000.
May	26	H. E. Rennels... 96230	138094	26	Buffalo, N.Y.	Steam	628	Below Isle Perrot...	Stranded... H. O'Hagan.	.....	Slight.
Aug.	15	Huronie... 107168	96230	18	Collingwood, Ont.	Wood Steam	2,211-45	Angus island...	Stranded... E. Wallanshaw.	.....	Partial.
Aug.	28	Homer Warren... 130222	107168	18	Toronto...	Steel Steam	304-0	Off Sodus Point, U.S.A.	Foundered... Wm. Walker.	9	Total: Ship, \$2,000. Cargo, \$4,500. Partial, \$2,000.
Oct.	29	Howard W... 133821	130222	28	Montreal...	Wood Steam	923-97	Lake St. Francis...	Collided with Lakeport... L. Daigneault.	.....	Partial, \$2,000.
Nov.	8	Ionic... 116954	133821	45	Sarnia, Ont.	Wood Steam	1,030	Williamsburg Canal...	Foundered... Capt. Wilson.	.....	Total.
May	29	Joyland... 138108	116954	35	Montreal...	Steel Steam	1,071	East of Lock 4, Sou- langes canal.	Collided with Robert J. Rhodes.	.....	Partial, \$7,000.
Oct.	28	Jeanne d'Arc... 126146	138108	11	Montreal...	Wood Steam	69	Isle Perrot, Lake St. Louis.	Stranded... H. A. Patterson.	.....	Partial, \$180.
April	30	Keyport... 125459	126146	10	Newcastle...	Wood Steam	1,298	1 mile east of Coteau du Lac bridge.	Collided with Henry B. Hall.	.....	Partial, \$3,000.
						Steel Steam			J. Mullins.		



STATEMENT OF wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1 to December 31, 1919.—*Concluded.*

INLAND WATERS WRECKS—*Concluded.*

Date of Casualty.	Name of Ship, Official No.	Age of Ship, Years.	Registered Port.	How rigged, Iron or wood, Steam or sail.	Register Tonnage.	Port sailed from, Port bound to.	Place where Casualty happened.	Particulars of Casualty, Name of Master.	Lives lost.	Loss, Total or Partial.
Oct. 4	Keynor 133558	5	Newcastle-on-Tyne.	Schr. Steel Steam	1,090	Eric, Pa. Montreal.	½ mile E. of St. Anicet light, St. Lawrence river.	Stranded Wm. Smith.	.....	Partial.
June 10.	Lengell Boys.	.....	.....	.....	.....	.....	Cove island, Georgian bay.	Stranded	.....	Partial.
Aug. 19.	Lake Elkwater.	1	Detroit, Mich.	Steel Steam	1,093	Detroit. Montreal.	Near Lancaster light, lake St. Francis.	Stranded B. J. Shaw.	.....	Partial.
Oct. 29	Lakeport 3140	39	Cleveland.	Iron Steam	643	Ashtabula Montreal.	Hamilton island, Lake St. Francis.	Collided with <i>Howard W.</i> J. Gallagher.	.....	Partial, \$3,000.
Aug. 4	Marcel W. 138505	33	Montreal.	Steel Steam	636-90	Montreal. Erie, Pa.	Entrance to Port Weller, Ont.	Stranded J. E. Ouellette.	.....	Total, \$50,000.
Oct. 29	Malton 130439	31	Sarnia, Ont.	Wood Steam	988	Montreal Port Colborne.	Lachine canal.	Stranded J. A. Smith.	.....	Partial, \$6,000.
Nov	Myron	.....	(American)	.....	.....	.....	Lake Superior	Foundered	17	Total.
Nov 9	N. J. Nisson 95603	39	(American)	Steam 2 masts, Wood Steam	368	Bay City, Mich. Meaford, Ont.	Meaford.	Foundered H. Erbe.	.....	Total, \$500,000.
May 27	Ophir 112173	17	Toronto.	Steel Steam	7-61	.....	Parry Sound Harbour.	Burnt M. Pearce.	.....	Total, \$1,000.
Oct. 24	P. W. D. 111 133941	.....	Ottawa.	Dredge Wood Sail	103	Cobourg, Ont. Hamilton.	11 miles E. N. E. of Hamilton, lake Ontario.	Foundered H. J. Matthews.	.....	Total.
Sept 30	Richard W. 133822	28	Montreal	Wood Steam	904-55	Montreal. Toledo, Ohio.	Lake St. Louis.	Stranded J. B. C. Haymond.	.....	Partial.
Oct. 28	St. Louis 74622	43	Montreal	Wood Steam	35-41	Montreal Melocheville.	Between Isle Thibeault and Isle Thomas, lake St. Louis.	Foundered Chs. Polon.	.....	Partial.
July 25	T. P. Phelan 140953	1	Montreal	Steel Steam	768-74	Port Colborne Montreal.	Fraser shoal, St. Lawrence river.	Stranded R. E. J. Shannon.	.....	Partial, \$2,000.
Oct. 31.	W. J. Carter.	.....	.....	.....	.....	.....	Yorkshire island.	Stranded	.....	Partial.



SESSIONAL PAPER No. 21

## MASTERS AND SEAMEN BRANCH.

REPORT OF B. F. BURNETT, SUPERINTENDENT.

During the fiscal year 1919-20, navigation schools were in operation at St. John, N.B., Halifax, N.S., Yarmouth, N.S., and Quebec, P.Q.; and marine lectures were delivered at North Sydney, C.B., Yarmouth, N.S., Collingwood, Ont., and Vancouver, B.C.

Examinations for masters' and mates' certificates were held at Halifax, N.S., Yarmouth, N.S., North Sydney, B.C., Charlottetown, P.E.I., St. John, N.B., Quebec, P.Q., Montreal, P.Q., Ottawa, Ont., Kingston, Ont., Toronto, Ont., Collingwood, Ont., Port Arthur, Ont., West Selkirk, Man., Edmonton, Alta., Nelson, B.C., Prince Rupert, B.C., Vancouver and Victoria, B.C.

Issued during the year: 9 masters', 16 mates' and 12 second mates' sea-going certificates of competency; 97 masters' and 92 mates' coasting certificates of competency; 38 masters' and 33 mates' inland waters certificates of competency; 36 masters' and 17 mates' minor inland waters certificates of competency and 47 masters' temporary certificates.

During the year 18,208 seamen were shipped at the various shipping offices.

## PILOTAGE REPORT.

CAPT. G. E. L. ROBERTSON, SUPERINTENDENT GENERAL.

Following the report of the Royal Commission on Pilotage, I was transferred to Ottawa on the 1st July, 1919, as Superintendent General of Pilotage.

The Minister of Marine and Fisheries is the Pilotage Authority for the Pilotage districts of Quebec and Montreal, and all matters relating to pilotage are dealt with through the local superintendent of pilots at Quebec. There are 50 pilots and 9 apprentices in the Montreal district, and 62 pilots and 8 apprentices in the Quebec district. The gross earnings of pilots in the Quebec district was \$141,917.77, and in the Montreal district \$133,364.36, giving an average of \$2,288.97 and \$2,600 to each pilot of the Quebec and Montreal districts, respectively. All expenses for these services are paid out of public funds. Expenses for fiscal year ending 31st March, 1920, were \$106,806.24.

In the Montreal district 5 per cent of the gross earnings of pilots is deducted for the Pension Fund (Montreal Decayed Pilots' Pension Fund). This fund is administered without charge for the Montreal pilots by the Department of Finance. Each pilot on retiring receives a pension of \$300 per annum, and \$150 per annum is paid to the widow of a pilot who dies either while on active service or who has retired.

During September, 1919, the pilotage rates for inland, coasting and sea-going steamers was increased 25 cents per foot of draught, this making them \$3.25, \$3.50 and \$4.00 respectively. This was done as the pilots represented that the rates in force did not allow for sufficient remuneration.

In the Quebec district 7 per cent of the gross earnings of the pilots is deducted for the pension fund. This fund is administered by the Quebec Pilots' Corporation, and amounted on December 31st, 1919, to \$87,524.10. In addition to the pension received from the corporation, certain retired pilots, 30 in number, receive an annual pension of \$300 from the Government.

The Pilotage district of Halifax, which was taken over in 1918 under the provisions of the War Measures Act, was formally taken over, with the Minister as the Pilotage Authority, on 1st January, 1920. New by-laws for the government of this district are being prepared, and will be applied at an early date.



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There are 13 first-class, 4 second-class, and 4 apprentice pilots in this district. The gross earnings for the year ending 31st December, 1919, were \$58,893.93. Each first-class pilot received \$3,604.79, and each second-class pilot \$1,802.39. Five per cent of gross earnings are deducted for the pension fund. Pilots on retiring receive a pension of \$50 to \$600, according to length of service. This fund is administered for the Halifax pilots by the Department of Finance without charge.

The Minister of Marine and Fisheries has, by an Order in Council, dated 21st December, 1918, been appointed the Pilotage Authority for the Pilotage District of St. John, N.B., and steps are being taken to have a local superintendent appointed and by-laws for the government of the district prepared.

The Pilotage Districts of Nanaimo, Vancouver, and Victoria-Esquimalt were, on the recommendation of the Royal Commission on Pilotage, amalgamated into one district, called the "Pilotage District of British Columbia," with the Minister of Marine and Fisheries as the Pilotage Authority, the orders in Council in this regard being dated 10th September, 1919, and 20th December, 1919. The department formally took charge on the 1st January, 1920. Lieut.-Commander B. L. Johnson, D.S.O., was appointed Superintendent of Pilots, with headquarters at Victoria, B.C. There are 17 pilots in this district. Two over-age pilots have been retired and placed in charge of the pilotage stations at Nanaimo and Vancouver.

The pilotage dues are collected by the Collectors of Customs and forwarded direct to Ottawa and deposited to the credit of the Receiver General. The pilots receive 60 per cent of the gross receipts, 40 per cent being retained for expenses. Each pilot receives up to a maximum of \$325 per month, 5 per cent being deducted for the Superannuation Fund.

Of the thirty-eight other pilotage authorities constituted under the authority of the Governor in Council in pursuance of the provisions of the Canada Shipping Act, twenty-five have forwarded returns for 1919.

### SIGNAL STATION, CITADEL, HALIFAX. N.S.

Record of shipping from April 1, 1919, to March 31, 1920, by F. C. Kilburn Major, R.C.E., Superintendent of Signals:—

Total vessels reported.....	1,487
" arrived.....	1,484
" passed.....	3

### SABLE ISLAND.

Mr. J. U. Blakeney, ex-superintendent, reports boats on hand: 3 life boats, 3 surf boats, 2 dories, 1 motor dory.

Live stock on hand: 34 horses and colts, 40 horned cattled, 2 pigs.

Wrecks: SS. *Plataea*, stranded on north side of island on November 7; crew of 30 were all safely landed.

Surf boat was smashed along C.G.S *Stanley* in April, 1919, and should be replaced.

### REPORTS OF AGENCIES

#### HALIFAX AGENCY.

In accordance with departmental instructions, the light-stations and buoys on the west coast of Nova Scotia from cape Sable north, and on the south shore of the Bay of Fundy, including Minas basin, and the south shore of Chignecto bay, were transferred to the St. John, N.B., agency on April 1, 1919.



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A new fence was built at the north entrance to Dartmouth depot, and repairs to the wharf are being carried out.

New aids to navigation during the year consisted of three spar buoys placed in Voglers cove, Port Medway, and two spar buoys at Chimney Corner, Cape Breton, and also at Port Morien in South Ingonish.

The C.G.S. *Lady Laurier* was employed in the district from April to August, 1919; from August to the end of November was at Halifax undergoing repairs, and from then on was engaged in agency work.

The C.G.S. *Stanley* was engaged from April to December 4 continuously in agency work, and from that date to the end of March was laid up for repairs.

The C.G.S. *Aranmore* during the months of April, May, June and July underwent repairs, from then until December 10 was employed in the district, afterwards going into winter quarters.

The lightship *Halifax No. 15* took fire and sank at dock, Dartmouth depot, on November 2, 1918, was refloated, repaired, and placed on station at Sambro bank, April 24, 1919. On November 6, 1919, broke her moorings during a heavy gale, made Liverpool harbour, coaled and arrived at Halifax on November 11; after repairing proceeded to her station on November 25. On March 14 again lost her moorings in a heavy gale, arrived at Halifax March 15, after securing new moorings, proceeded to her station on March 19.

## SYDNEY, N.S., SUB-AGENCY.

Government steamers *Lady Laurier*, *Aranmore*, *Stanley*, and *Montcalm* made frequent calls in connection with lifting and placing harbour and coast buoys, and also in carrying lighthouse supplies.

For the year ended March 31, 1920, the shipping trade of the port was:—

Inwards—Foreign ships.....	506	tonnage.....	777,107
Coastwise ships.....	1,512	“ .....	836,828
Total.....	2,018		1,613,935
Outwards—Foreign ships.....	826	“ .....	849,859
Coastwise ships.....	1,214	“ .....	730,298
Total.....	2,040		1,580,157

## PICTOU, N.S., SUB AGENCY.

Buoys were lifted in December, 1918, repaired, painted, and placed in position on April 29, 1919, the work of lifting and replacing the buoys being done by the SS. *Brant*.

For the Charlottetown, P.E.I. agency 543 barrels of oil were discharged and stored, and delivery checked when removed. The steamers *Brant*, *Stanley*, *Montcalm*, and *Lady Evelyn* were employed in this work.

Coal and supplies were obtained for steamers calling during the season.

Steamers arriving, 174, tonnage 30,684; steamers departing 175, tonnage 31,627; sailing vessels arriving, 400, tonnage 26,488; sailing vessels departing, 413, tonnage 26,969.

Assistance was given in preparing the SS. *Canadian Sealer* for the Magdalen islands service.

## QUEBEC AGENCY.

In accordance with departmental instructions, the lightstations and buoys eastward of Natashkwan along the north shore, and those of Newfoundland and strait of Belle Isle and Magdalen islands, including Bird rocks, were transferred to the Charlottetown, P.E.I. agency on April 1, 1919, and on that date this agency took over from the St. John, N.B. one, all the lights and buoys on the south side of Bay des Chaleurs, from Campbellton to Miscou.



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The vessels under the control of the agency during the season were: Ice breakers *Montcalm* and *Champlain*; steamers *Druid*, *Eureka*, and *Rouville*; lightships *Red Islet*, *Prince Shoal*, *White Island*, and *Lower Traverse*. For winter repairs and supplies the icebreaker *Lady Grey* and the steamer *Bellechasse* were employed.

The ferry service between River Ouelle wharf and the north shore of the river St. Lawrence was conducted during winter and summer by the *Champlain*.

## CHARLOTTETOWN AGENCY.

Besides the district taken over from the Quebec agency, the lightstations and buoys on the east coast of New Brunswick, from cape Tormentine to Shippigan were, on April 1, 1919, taken over from the St. John, N.B., agency.

During the year the larger part of the marine wharf at Charlottetown was repaired and a large warehouse built on the eastern side. Warehouse No. 4 was moved to the head of the wharf, to be used as a repair shop. No. 1 warehouse was overhauled and blocked up, and roof lights put round the building, and both Nos. 1 and 2 warehouses were fitted for elevators.

Work was commenced on the wharf on February 7, 1919, with five men, and continued until the late autumn.

The C.G.S. *Brant* was employed in the work of the agency throughout the season, during June and July the C.G.S. *Stanley*, and during November the C.G.S. *Montcalm* and the C.G.S. *Aranmore*.

## VICTORIA, B.C., AGENCY.

The reinforced concrete tower at Dryad point, Lama passage, commenced last year, to replace the former wooden one, was completed.

The work of constructing a combined light and fog-alarm station at Triple island, Hecate straits, was begun in August, 1919, but had to be abandoned before completion, owing to inclement weather in the latter part of November.

The rearrangement of the lighting system at the mouth of the Fraser river was completed, and the system of range lights extended up the river as far as New Westminster.

A combined concrete light tower and fog-alarm was constructed on Barrett rock, and a combined keeper's dwelling and engine-room was built of wood on the shore opposite the rock.

The Government steamers *Estevan*, *Newington*, with the chartered SS. *Leebro*, were employed throughout the year in the district in the work of supplying lighthouses, buoy service, etc.

Only one wreck occurred in the district during the year, a small fishing vessel was blown ashore on Triangle island in the latter part of April, 1919. One man was drowned and his body picked up, and two survivors were taken off the island by the C.G.S. *Estevan*.

## PRINCE RUPERT, B.C., AGENCY.

On January 31, 1920 the Prince Rupert district was changed from a sub-agency to an agency, taking over all aids to navigation from Cape Caution to the Alaskan boundary, including Queen Charlotte islands.

Automatic acetylene beacons were erected on Kinnahan and Genn islands.

An oil-lighted day beacon was erected on David point, close to Ocean falls. An Aga beacon was established on Kamp point to aid vessels crossing Wright sound, and making the entrance to Grenville channel.

All light stations were inspected during the year, and found to be in a satisfactory condition.



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The agency maintained during the season: 11 light stations, 10 acetylene gas buoys, 1 Aga type buoy, 29 acetylene gas beacons, 4 can buoys, 6 conical buoys, 2 platform buoys, 20 spar buoys, and 25 day beacons.

The C.G.S. *Estevan* was employed in the work of the agency from July 26 to the close of the season, the C.G.S. *Lcebro* from October 20 to November 25, and the C.G.S. *Newington* from June 29, 1919, to the end of the season.

## FORT WILLIAM, ONT., SUB-AGENCY.

Icebreaking was carried on as usual, and navigation in the district opened on April 13, and closed on December 12.

The lightstations went into operation on April 13.

On April 17, 17 spar buoys were placed in the channels at Port Arthur and Fort William harbours.

There were maintained in the district during the year 12 lightstations, 2 sets of ranges, 2 Aga mast lights, 3 gas and bell buoys, 2 gas buoys, and 17 spar buoys.

## MONTREAL AGENCY.

The tug *Margot* was purchased for use in lighthouse construction work. Protection work was carried on at Cape Madeleine upper front light, and Ile de Grace back light. A new concrete pier and bridge were constructed at Lachine back light.

The Dominion steamers *Argenteuil*, *Dollard*, *Reserve*, *Vercheres* and *Shamrock* were employed during the season in agency work.

The old schooner *Bengalore* was removed from the Richelieu river.

## DOMINION LIGHTHOUSE DEPOT, PRESCOTT, ONT.

During the fiscal year 1919-20 a large amount of lighthouse, fog-alarm, and buoy materials were made up and shipped for the various agencies and lightstations of the Department throughout the Dominion, and all necessary work was performed in connection with the maintenance of lights and of the buoy service in the Prescott division.

The work of making the C.G.S. *Concretia* suitable for a bouy tender was completed, extensive repairs were made to the C.G.S. *Scout*, and the drifter *C. D. 50* was converted into a lightship for Bar point.

Repairs were made to the docks, some of the old useless buildings were removed, and the yard considerably improved, the work being carried out in a satisfactory manner by a somewhat reduced staff.

The machine shop completed about 103 production orders during the year, as well as doing a good deal of work on orders not yet completed. The production orders included: the making of standard diamond vapour light parts, diaphone instruments, pistons, and other fog-alarm materials; remodelling of Reliance clocks, work on high and low model revolving pedestal apparatus, etc., and also necessary work for Government steamers and plant.

The carpenter shop made necessary repairs to the steamers *Scout* and *Concretia*, also to the South Lancaster wharf, and Barriefield front light, and a number of superstructures for buoys were prepared for various agencies.

In the paint shop all buoys and lighthouse lanterns belonging to the Prescott division were painted, also traction lanterns for stores and lightstations, and all lanterns sent in from various agencies for repairs. Necessary painting for Government steamers and plant was also done.

In the packing and shipping department 560 shipments were packed and sent out during the year, and cases and crates for the same were made. All second hand materials received at the depot for repairs or stock were unpacked, examined, and reported upon.

In the blacksmith shop all necessary forgings for apparatus, Government steamers, and plant were made, a quantity of anchor chain prepared, and orders for fog alarm and buoy materials completed.



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The brass foundry made castings for various kinds of apparatus and for Government steamers.

The shipyard shop attended to freight shipments to and from the depot, handled coal and heavy materials for the various departments, loaded and unloaded railway cars, looked after the depot yards.

All gas, can, and conical buoys stored on the depot dock were cleaned and painted, and a number of old buoys were overhauled and made serviceable, orders for concrete anchors were completed, and labour furnished for the various shops.

The gas test room overhauled and tested all buoy and beacon lanterns in the Prescott division, and all lighthouse lanterns were put in good condition. All buoy lanterns received from the various agencies for repairs were overhauled, tested, and returned.

All orders for carbide door caskets, purifier door caskets, flash burner caskets, and buoy lantern diaphragms were made up by this department.

Shipments of Pintsch gas to the depot were measured up and reported upon.

The gas lighting plant on the Bar point lightship was installed.

Fifteen patterns were made in the pattern shop, and a large number overhauled and altered.

Seventeen drawings were made in the drawing office.

The C.G.S. *Scout* and the C.G.S. *Concretia* were employed in agency work throughout the season.

#### PARRY SOUND, ONT., AGENCY.

This agency maintained during the season 15 gas buoys, 2 Trinity bell buoys, 1 conical buoy, and 181 spar buoys.

The Government steamers *Grenville* and *Lambton* were employed from the opening to the close of navigation in the district on the work of supplying light-houses and maintaining the buoy service.

In May a new illuminating apparatus was installed in Owen Sound front range, and the ship channel between Parry Sound and Waubaushene was buoyed.

During July and August, a new concrete gas-lighted beacon was erected at the entrance to Honey harbour, and a fog-alarm bell was installed on Davieaux island, lake Superior.

Several new day beacons were built for the inner channel between Parry Sound and Waubaushene.

The agency staff proper during the season comprised eleven employees.

#### ST. JOHN, N.B. AGENCY.

The usual number of light and fog-alarm stations, buoys, and beacons, were maintained throughout the year.

At Boars head protection work was done to the dwelling, and repairs made to road. At Green island a temporary fog-alarm was established. At Letite passage a new fog-alarm building was erected, and a diaphone with oil engines installed. A new blacksmith shop was built and equipped at the Marine depot. The oil shed destroyed by fire at Machias, Seal island, was rebuilt. A new wooden building was erected at Parrsboro, and a small diaphone plant installed. Repairs to equipment and sheds were carried out at St. John West wharves. At cape D'or 800 yards of rock excavation was done to prevent sliding of the cribs. Tongue shoal was abandoned as a watched light, and an unwatched gas installation with sun valve made in 1919.

Throughout the season the C.G.S. *Aberdeen* and the C.G.S. *Laurentian* were employed in lighthouse supplies and buoy service work in the agency; and the C.G.S. *Thos. Mason* was also employed in this work and in carrying officials and workmen to and from lightstations.



## REPORTS OF HARBOUR COMMISSIONERS.

## MONTREAL HARBOUR COMMISSION.

## PERSONNEL.

President, W. G. Ross; Commissioners, Farquhar Robertson, A. E. Labelle; officials: Secretary-Treasurer, M. P. Fennell, Jr.; Cashier, Thos. F. Trihey; Chief Engineer, F. W. Cowie, M. Inst., C.E., Consulting Engineer, Sir John Kennedy, assistant Chief Engineer, T. W. Harvie; General Superintendent of Grain Elevators, M. Peterson; Mechanical Superintendent, Geo. Gendron; Harbour Master, Capt. T. Bourassa, deputy Harbour Master, Capt. J. F. Symons; Comptroller, George E. Smart; Paymaster and Wharfinger, Robt. A. Eakin; Superintendent of Railway Terminals, J. Vaughan, assistant Superintendent of Railway Terminals, R. L. Mercier; Purchasing Agent, L. H. A. Archambault; Supervisor Customs Wharfages, P. E. Morant, Chief of Police, Lieut.-Col. E. A. Williams.

## MONTREAL'S PLACE AMONG THE WORLD PORTS.

The United States Department of Commerce, in its Statistical Abstract for 1919, thus gives the total export and import trade of the seven leading ports of the world for the latest year for which data are available:—

Port.	Year.	Imports.	Exports.	Total Commerce.
New York.....	1918	\$1,251,386,000	\$2,613,049,000	\$3,864,435,000
Liverpool.....	1917	1,813,488,000	1,091,743,000	2,905,231,000
London.....	1917	1,643,434,000	818,045,000	2,461,479,000
Hamburg.....	1913	1,084,325,000	817,275,000	1,901,600,000
Antwerp.....	1912	623,164,000	588,181,000	1,211,345,000
Marseilles.....	1915	518,756,000	304,290,000	823,046,000
Montreal.....	1918	204,818,000	524,365,000	729,183,000

Although Montreal occupies seventh place among world ports for total commerce, it occupies sixth place in the value of its exports.

## ACCOMMODATION.

For an expenditure so far of \$29,500,000, Montreal Harbour affords the following accommodations:—

One hundred steamship berths from 350 to 750 feet in length, with a depth of water from 20 to 35 feet.

Thirty-five of these steamship berths are modern concrete wharves, built in the past few years.

Two large modern fireproof elevators with conveyor system to 15 steamship berths, at which 9 vessels can be loaded with grain at one time.

Twenty-three permanent fireproof transit sheds.

Fifty-eight miles of harbour railway terminals.

Complete and valuable construction and repairs plants.

About 200 acres of land situated in the most valuable position, industrially, in Montreal, all reclaimed.



The extent of the wharves and piers at the end of the season was as follows:

For 30 ft. draft and over at O.L.W.....	26,396 lin. ft
or 4.9992 miles.	
For 25 to 27½ ft.....	13,442 lin. ft.
or 2.5458 miles.	
Total deep draft.....	39,838 lin. ft.
or 7.5450 miles.	

Included in this, five berths are available having a depth of 35 feet at O.L.W.

For 20 ft. draft and under.....	3,105 lin. ft.
or 0.5880 miles.	
Total wharfage, end of 1919.....	42,943 lin. ft.
or 8.1330 miles.	

SPECIAL FEATURES.

Montreal is on the line of route, east and west, between the great north-west of the American continent and European ports.

The harbour of Montreal is at the head of ocean navigation on the St. Lawrence, and at the foot of the inland navigation of the Great Lakes.

The great transcontinental railway lines of Canada all reach ocean navigation at Montreal.

During seven months of the year the Canadian transportation system, via the harbour of Montreal, competes with the greatlake and rail transportation system of the United States.

NAVIGATION CONDITIONS.

TABLE OF DISTANCES.

From.	To Liverpool.	To Rotterdam.
	Nautical Miles.	Nautical Miles.
Montreal (via Belle Isle).....	2,760	3,293
" (via Cabot straits).....	3,007	3,540
Quebec (via Belle Isle).....	2,625	3,158
" (via Cabot straits).....	2,872	3,405
Halifax.....	2,485	2,771
St. John, N.B.....	2,692	2,978
Portland, Me.....	2,776	3,062
Boston.....	2,854	3,140
New York.....	3,036	3,322
Philadelphia.....	3,172	3,458
New Orleans.....	4,525	4,813
San Francisco (via Panama canal).....	7,843	8,107
Vancouver (via Panama canal).....	8,648	8,912

ENGINEERING DEPARTMENT.

On the completion of the high-level railway to the Imperial Oil Works, Montreal East, at the end of last year, extensions and improvements were effected this year as follows:—

The spur embankment from the main line to the Imperial Oil wharf was completed, and also rip-rap protection on the outer face of the embankment from Vulcan wharf to Montreal East, 28,000 cubic yards of material being used on the extension and protection work.

In conjunction with the company, direct connection with No. 1 plant of the Canada Cement was established by a short spur track to the harbour boundary, the company continuing the spur from that point to a junction with their track near Notre Dame street.



## SESSIONAL PAPER No. 21

Railway connections to the Imperial Oil Company's works, Montreal East, were improved.

The high-level railway between Papineau avenue and Jail subways was widened, and two additional tracks laid down.

The siding accommodation adjoining the Commissioners' elevators was greatly increased, and a considerable amount of paving done in conjunction with the city authorities.

## SUMMARY OF RAILWAY EXTENSIONS.

	lin. ft.
Connection to Canada Cement Co.....	200
Connection to Imperial Oil Ltd.....	240
Crossover.....	150
Third track Canada Cement to Imperial Oil..	1,510
	<hr/>
High Level Railway Widening Papineau ave. to Jail Subway.....	2,100
On Common and Commissioners streets.....	1,972
On Low Level Wharf, Sections 27-28.....	8,113
Industrial Sidings:—	2,859
Molasses Products Co. (additional).....	252
Canadian Spool Cotton Co.:—	
(On Harbour property).....	91
(On Company's property 494').	
Section 82 (additional on Harbour property).....	328
	<hr/>
Total additional track on Harbour property.....	15,715
Equal to 3 miles approximately.	

*New Wharves.*—The construction of wharves suspended during the last two years of the war, was resumed. Jacques Cartier pier was lengthened 218 feet on the east side and 273 feet on the west side, the new pier head line measuring 294 feet, making in all 785 feet of standard high level quay-wall. The building of new shore wharves from section 30 to the Dominion Coal Company's wharf was resumed.

*Dredging and Filling.*—Two dredges worked all season on the channel and cribseats for the proposed south side of Bickerdike pier; the area covered being  $3\frac{1}{2}$  acres.

On the 15th of August one dredge resumed work on the 20-foot channel E.L.W. behind St. Helen's island, covering during the season an area of about  $2\frac{1}{2}$  acres, the cut extended being 250 feet in length, to a width of 300 feet.

Government dredge *No. 1* was engaged during the season in widening the ship channel opposite the drydock, and provided 6,200 cubic yards of material for reclamation above the drydock for filling in the light between the drydock and Sutherland pier, the filling on this work during the season amounted to 111,000 cubic yards.

*New Buildings.*—Concrete foundation and steel work for three new sheds were constructed in the fall: No. 17, 310 feet by 100 feet; No. 18, 530 feet by 85 feet, and No. 19, 520 feet by 85 feet; these will have two decks, a conveyor gallery system of two belts, and modern fireproof offices and workrooms.

Plans have been made and construction work is in progress on a new locomotive repair shop in Harbour yard, on Notre-Dame street, East. This building, 130 feet by 42 feet, will be fireproof, and provided with a 30-ton traveller crane and pit.

The commissioners' floating crane lightered and handled 10,999 tons during the season, and proved, as usual, a valuable adjunct to the port.

The electrical equipment of the head office, dredging plant, transit sheds, elevators, conveyors, freight hoists, escalators, engine shops, and sub-stations, were maintained and improved, and the harbour lighting, comprising flame arcs and powerful nitrogen units was operated throughout the season.

The saw-mill delivered to the works during the season 717,012 feet B.M., and 328,722 lineal feet



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## RAILWAY TRAFFIC DEPARTMENT.

The increase in mileage for the year was about 3 miles, making at present a total of 58 miles of track to be maintained. During the year 13,742 ties were renewed, and 17,970 lineal yards of rails replaced. In spite of the enormous tonnage handled per mile, no serious mishap to traffic occurred during the year. The total number of cars handled during the year was 182,328.

## GRAIN ELEVATOR SYSTEM.

The capacity of the commissioners' elevators is:—

Elevator No. 1.....	4,000,000 bushels.
" No. 2.....	2,652,000 "
Grand Trunk Elevators "A" and "B".....	2,150,000 "

The total quantity of grain handled by elevator No. 1 during the season was 19,530,635 bushels; by No. 2, 17,820,924 bushels—a total of 35,509,323 bushels for the season. Only one floating elevator was operated during the season, which transferred 20,326 bushels.

## POLICE DEPARTMENT.

During 1919 the Harbour Police Force consisted of 4 officers and 53 men, uniformed and armed, who regulated the traffic, maintained order, and protected life and property within the harbour limits. The services of 30 of this force were constantly at the disposal of the various shipping companies during the season.

## FINANCIAL STATEMENT.

Receipts on revenue account were \$1,990,594.39, a decrease of \$113,597.09 from the previous year. Cost of operations, maintenance and interest was \$2,114,555.61, an increase over the previous year of \$88,013.54, leaving a deficit to the debit of revenue account for the year of \$123,961.22. The interest charges, amounting to \$911,320.49, show an increase of \$7,735.22 on new loans, due to the continued carrying out of works of improvement.

There was received from the Dominion Government on loan \$670,000 on account of capital expenditure for works of improvement, on which the Government have raised the rate of interest from  $3\frac{1}{2}$  per cent to 5 per cent.

The disbursements on capital account in 1919 were \$1,176,286.30.

## GENERAL.

The plans for the building of a public warehouse and cold storage plant, and the electrification of the harbour railway system outlined in last year's report are being carried out.

The site decided upon for the warehouse is inside the harbour retaining wall on the west side of the foot of Beaudry street, and that for the power house to contain the mechanical refrigerating equipment, and the electrical equipment for the operation of the harbour electric railways, will be on the east side of the foot of Beaudry street.

The building when completed will be 436 feet by 103 feet, and will consist of eight floors and a basement, equipped with eight large freight elevators. Each cold storage floor will be divided into nine rooms varying in capacity from 77,750 cubic feet to 35,750 cubic feet.

The building will be of a fireproof character, and equipped with an up-to-date automatic fire sprinkler system. The power-house opposite will be a considerably smaller building similar in appearance, and will consist of a basement, two floors, and a condenser house on the roof.



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The piling on the ground to be occupied by the cold storage warehouse plant, has been successfully completed by the McArthur Concrete Pile and Foundation Company of Montreal, the piles being known as "pedestal piles," formed by driving a steel core and shell, then removing the core and filling the shell with concrete.

The work of the electrification of the harbour railway system was commenced in September, 1919, and carried on throughout the winter months; steady progress is being made, the work being divided into four sections:—

1. Power Station Machinery Equipment.
2. Control, Protective and Signal Equipment.
3. Overhead Catenary Line Material.
4. Rail Bonding Material.

## QUEBEC HARBOUR COMMISSION.

## CHIEF ENGINEER'S REPORT.

Construction work on landing shed No. 28, Princess Louise docks, and subsidiary grain galleries, has been almost completed, so that all will be ready for use by the opening of navigation next spring. Electric lights have been installed in this shed, and a Gantry crane, and car loading and railway lines to serve the shed laid down.

The lease of the shipbuilding site at the west end of the Louise embankment to the Quebec Shipbuilding and Repair Company terminated last summer, and all the company's plant and material have been removed, making this area and the adjoining dock frontage available for use next season.

The grading of the dredged basin in the river St. Charles has been continued, and the approach to the basin widened and deepened.

Damage caused to sheds on pier No. 1 by last November storms has been repaired, and the work of raising the finished surfaces of this pier and of landing sheds Nos. 25 and 27 was begun and continued until the close of the season.

Permanent brick paved roadways and approaches have been laid down between the main embankment roadway and landing sheds Nos. 28 and 29; a brick paved roadway is also under construction at the west end of the embankment, affording exit from the docks by way of Ramsay street.

A brick building has been erected at the east end of the main carriage roadway to serve as a waiting room for passengers embarking by tender on ocean ships not berthing at the breakwater.

Railway lines have been laid down to the new landing shed No. 28 and connected with the main lines.

A new 8-inch water main has been laid down at the west end of the embankment to supply 6-inch main installed for water service to sheds Nos. 28 and 29.

The long wharf at Indian cove, damaged by last November's high tide, has been rebuilt and repaired with the exception of about 500 feet, which still has to be built up to an additional height of seven feet.

All the commissioners' properties have been maintained in good condition.

## WHARFINGER'S REPORT.

The traffic in connection with the St. Charles docks and wharves was : inwards, 331 vessels, 822,983 tons register; outwards, 274 vessels, 506,879 tons register; lower port vessels, 111, 18,231 tons register.



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## HARBOUR MASTER'S REPORT.

## PORT OF QUEBEC—RECORD OF SHIPPING ARRIVALS, 1919.

	Number of Vessels.	Gross tonnage.
Coasting vessels from seaward.....	141	88,957
Coasting vessels from Montreal and Great Lakes.....	186	186,738
Ocean Steamships—Inwards.....	147	1,152,244
Ocean Steamships—Outwards <sup>1</sup> .....	181	546,151
	655	1,974,090

<sup>1</sup>Including sea-going vessels built on the Great Lakes.

For the first time in the history of the port navigation last winter was hardly ever closed. The last vessel sailed on the 30th of December, and on the 21st of January the SS. *Canadian Voyageur* left for Halifax with the C.G.S. *Montcalm* as escort.

Shipbuilding was active throughout the season. Five steam trawlers for the naval service and eleven steam wooden vessels for the French Government were built by the Davie Shipbuilding and Repairing Company, Limited, and one steamer also for the French Government, by the National Shipbuilding Company, of Levis.

In the fall some newly-built ships came into port from various western shipyards to be completed for sea; fourteen of these, built of wood, were delayed by ice, and wintered in the port, as well as eight United States Eagle boats and one United States Navy tug.

## TRAFFIC MANAGER'S REPORT.

During the year 42,113 cars were handled by the commissioners' locomotives, and 10,355 cars by the car ferry

## GRAIN ELEVATOR.

Harbour Commissioners' elevator No. 2 received 4,534,067 bushels of grain during the season, and delivered 4,100,403 bushels, leaving in store 433,664 bushels.

## REVENUE AND EXPENDITURE.

The revenue for 1919 was \$389,502.62, and the expenditure \$438,673.17, leaving a deficit for the year of \$49,170.55.

## FACILITIES OF THE PORT OF QUEBEC.

*Steamship berths.*—In wet dock, six berths of from 400 to 500 feet in length. In tidal harbour, four berths of from 400 to 500 feet in length. Breakwater—four berths of 500 feet in length, or three berths of 700 feet in length, or two berths of 1,100 feet in length. Pointe-a-Carcy wharves—five berths, one ocean, one car ferry, two coasting, and one bunkering. River St. Charles basin—seven berths of from 500 to 600 feet in length.

*Depth of water at low tide.*—wet dock, 25 to 26 feet; tidal harbour, 24 to 30 feet; breakwater, 40 feet; Point-a-Carcy wharves opposite shed, 21; ocean berth and car ferry berth, 40 feet; river St. Charles, 35 feet.

*Grain Elevators.*—One grain elevator with a capacity of 250,000 bushels.

One fireproof concrete grain elevator, with a capacity of 2,000,000 bushels, with marine tower, conveyors and grain galleries; loading capacity, 60,000 bushels per hour; it has also a grain dryer, a "Richardson separator," and a baggage shed.



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*Facilities for handling Cargoes.*—Four locomotives for switching cars. Railway lines to all ships, berths and sheds. One 50-ton floating crane. Cars and scows for removing ships' ballasts. Five locomotive cranes, with capacity up to 38 tons. City water, electric light, and power installation.

*Landing sheds.*—There are thirteen landing sheds in all, with a combined space of 542,550 square feet of floor area.

*Railway facilities.*—The Quebec Harbour Commissioners have 16 miles of tracks on docks for handling of freight. Shunting on docks is done by Harbour Commissioners.

With the completion of the Quebec bridge, the docks are now accessible to all railways.

The Canadian Pacific Railway and the Canadian National Railways (Canadian Northern and National Transcontinental) have their Quebec terminus within the harbour limits.

*Graving docks.*—Quebec harbour possesses two graving docks, one 600 feet long by 62 feet wide at entrance and one (new) 1,150 feet long by 120 feet wide at entrance, capable of taking the largest vessels afloat, with attached workshops capable of executing all required repairs.

## TARIFFS.

The Quebec Harbour Commissioners' tariffs relating to wharfage, switching and grain elevators, have been carefully revised during the year 1919. These new tariffs, which will compare favourably with any other existing tariffs at other ports, were put into effect on May 1, 1919.

## THREE RIVERS HARBOUR COMMISSION

The Commission has not been able to make up the deficit of 1918, nor have they been able to avert another though smaller deficit for 1919, as shown by the statement. This is chiefly due to the loss of the bituminous coal trade, now conveyed by railway. The port has also suffered through the decrease of the lumber trade with the United States. However, a large pulp mill is being built at the mouth of the St. Maurice river, which will be in operation next spring and undoubtedly contribute to the trade of the port.

The Quebec and Levis Ferry Company are desirous of establishing a car ferry service between Three Rivers and Ste. Angele de Laval, the terminus of the Grand Trunk. This would have to be done by direct negotiation with the Government. The linking up of the shores of the river in the vicinity of Three Rivers would undoubtedly benefit the shipping and the general trade of the port.

STATEMENT of number and tonnage of steamers and other vessels reported inward and outward of the port of Three Rivers, for the year 1919.

OCEAN TRAFFIC—Return of Vessels Inward.			OCEAN TRAFFIC—Return of Vessels Outward.		
Nationality.	No.	Tons.	Cleared for	No.	Tons.
British.....	7	17,505	Inland ports.....	3	8,515
			England.....	4	8,990
				7	17,505
United States Traffic.			Inland Traffic.		
Canal boats.....	141	14,126	Schooners and barges.....	98	18,754
			Tugs and steamboats.....	697	371,360
				795	390,114



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## RECAPITULATION.

	No.	Tons.
Ocean traffic.....	7	17,505
United States Traffic.....	141	14,126
Inland traffic.....	795	890,114
Grand total.....	943	921,745

## MERCHANDISE.

Inward.		Outward.	
Hard coal, tons.....	13,724	Sand, tons.....	29,500
Soft coal, tons.....	2,405	Lumber, feet.....	25,163,192
Sand, tons.....	1,125	Pulpwood, cords.....	5,323
Hay, tons.....	10	Soft coal, tons.....	314
Cordwood, cords.....	925	Steel, tons.....	1,000
Sulphur, tons.....	3,519	Machinery, tons.....	38
Bricks.....	1,065,000	Cement, tons.....	10
Apples, bushels.....	1,350	Bricks.....	25,000
Lumber, feet.....	520,875		
Potatoes, bushels.....	450		

## RECEIPTS AND DISBURSEMENTS FOR THE YEAR 1919.

Receipts.		Disbursements.	
Tonnage dues.....\$	896 29	Current expenses.....\$	363 35
Harbour dues: inward.....	1,597 67	Salaries and commission.....	5,389 60
Harbour dues: outward.....	1,736 28	Printing and stationery.....	147 60
Rent of wharves and moorage.....	4,396 10	Travelling.....	65 05
Commutation, divers, and discounts.....	21,818 05	Repairs and general harbour expenses.....	2,120 90
Similarly amounts and notes to be collected.....	2,019 00	Interest on debentures.....	9,525 00
Reserve account.....	23 03	Construction.....	345 62
		Divers repayments.....	11,288 75
		Total expenses on revenues.....\$	29,245 87
Balance on the 31 December, 1918.....	\$ 32,486 42	Deposits in bank, cash in hand and notes to be collected Dec. 31, 1919.....	4,479 27
	1,238 72		
	\$ 33,725 14		\$ 33,725 14

## VANCOUVER HARBOUR COMMISSION.

On the 7th of July, 1919, an Act was passed providing an expenditure of \$5,000,000 for the development and equipment of the harbour. On October 1 the board was reconstituted; the members of the new board are—President, G. H. Kirkpatrick, Esq., Commissioners S. McLay, Esq., and A. R. McKenzie, Esq.

## BALLANTYNE PIER.

Mr. A. D. Swan, M. Inst. C.E., was instructed to prepare plans for the above new pier on Burrard inlet, to be equipped with reinforced concrete warehouses and modern freight handling appliances. Coincident with the construction of this pier a freight car ferry service will be installed opening up as industrial sites, extensive flats on the north shore of Burrard inlet. It is estimated that these works will take two years to complete.

## OTHER PROJECTS.

Are (1) the providing of public booming grounds; (2) the preparation of Kitsilano Indian Reserve for the accommodation of industries. This area underbrushed last year is now being cleared and graded. The success of the reclamation of the area known as Granville island, now leased to industrial concerns, and the continued demand for industrial sites, should insure the financial success of this last project.



SESSIONAL PAPER No. 21

SHIPBUILDING.

During the year there were built in local yards twelve steel vessels with a total tonnage of 90,200.

GOVERNMENT WHARF.

The number of vessels of all classes berthed at this wharf during the year was 271, and the volume of business handled 68,000 tons of general merchant and 18,000,000 feet B.M. of lumber.

SHIPPING RETURNS.

According to the Customs returns, the classification of vessels entering and clearing during the year ending 31st March, 1920, is as follows:—

	Vessels.	Tonnage.
Foreign inwards.....	1,430	1,761,008
“ outwards.....	1,298	1,416,979
Coastwise inwards.....	9,964	3,576,597
“ outwards.....	10,308	3,936,827
	23,000	10,691,411

RECEIPTS AND EXPENDITURES.

Total operating receipts, \$106,675.97; total operating expenditures, \$75,-466.06; surplus for year ended December 31, 1919, \$31,209.91.

PICTOU HARBOUR COMMISSION.

STATEMENT OF HARBOUR DUES FOR THE YEAR ENDED DECEMBER 31, 1919.

Balance in bank, December, 1918.....	\$	100 00
Collections for the season of 1919.....		362 88
	\$	462 88
Disbursements, for 1919:—		
Harbour Masters' salary.....	\$	200 00
Paid Harbour Commissioners.....		162 88
Balance in bank.....		100 00
	\$	462 88

COMMISSIONERS' ACCOUNT FOR YEAR ENDED DECEMBER 31, 1919.

1919			
May 1	To be paid s.s. Hiawatha putting out buoys.....	\$	30 00
	“ W. McLean, bushing channel.....		18 00
“ 2	“ E. C. McDonald, bushing East river.....		31 00
June 20	“ P. Hall, painting buoys.....		10 00
Dec. 1	“ ss. Hiawatha, taking up buoys.....		40 00
	“ H. B. Ross, Secretary.....		100 02
	Balance.....		280 25
		\$	280 25
		\$	509 27
1918.			
Dec. 3	By balance.....	\$	346 39
	“ amount from collector of customs dues, 1919.....		162 88
		\$	509 27
	By balance.....	\$	280 25







## SESSIONAL PAPER No. 21

The amount of grain shipped from the port of Montreal during 1918 was: wheat, 32,818 056 bushels; peas, 42,703 bushels; barley, 10,810,515 bushels; oats 2,451,149 bushels; corn, 285,112 bushels; rye, 775,003 bushels; total of all grains, 47,182,639 bushels; a decrease of 12,249,291 bushels as compared with the shipments for 1918.

New lines of steamships operating from the port of Montreal during the season were: "Canadian Government Mercantile Marine, Limited," now operating sixteen vessels to the United Kingdom, West Indies, River Platte, and St. Johns, Nfld. "Compagnie Canadienne Transatlantique, Limitee," operating eight vessels (passenger and cargo) to French ports. "France and Canada Line," operating five vessels to French ports. "Marine Navigation Company" operating two vessels to French ports. "Houston Line," operating four vessels to River Platte. The C.P.O.S. are now operating two vessels recently bought from Norwegian owners to Scandinavian ports. Vessels have also sailed for Roumania, and Antwerp, the latter port being again open.

## REPORT OF THE QUEBEC SALVAGE AND WRECKING COMPANY.

1919.

May 23 to 26.—Towed Department of Public Works dredge No. 116 and four scows from Quebec to Rimouski.

July 2nd and 3rd.—Services rendered by ss. *Lord Strathcona* assisting in operation of lifting ss. *Montmagny*.

July 17th and 18th.—Services rendered by ss. *Lord Strathcona* assisting in operation of lifting ss. *Montmagny*.

July 22nd and 23rd.—Towed off new steamer C-3, Three Rivers, which had stuck on ways during launching.

July 23rd and 24th.—Towed Department of Public Works dredge No. 1 from Quebec to Three Rivers.

August 12th.—Services rendered by ss. *Lord Strathcona* assisting in operation of lifting ss. *Montmagny*.

Aug. 22nd and 23rd.—Services rendered by ss. *Lord Strathcona* assisting in operation of lifting ss. *Montmagny*.

Aug. 23rd to 30th.—Salved British steamer *Admiral Hastings* which steamer ran ashore off South West point, Anticosti.

September 15th and 16th.—Services rendered by ss. *Lord Strathcona* and schooner *G.T.D.* assisting in operation of lifting ss. *Montmagny*.

October 4th to 6th.—Towed Department of Public Works dredge and scow from Rimouski to Quebec.

October 8th.—Services rendered by ss. *Lord Strathcona* and schooner *G.T.D.* assisting in operation of lifting ss. *Montmagny*.

October 12th to 14th.—Diving services rendered steamer *Captain Dan* sunk Quebec harbour.

October 15th to 18th.—Towed Department of Public Works plant No. 110 from Port Alfred to Quebec.

November 7th to 20th.—Salvage service rendered British steamer *Germanicus* which stranded on West reef off Bic island but had to postpone salvage owing to lateness of season also to weather.

November 21st to 25th.—Salvage services rendered American schooner *George S. Smith* stranded off Point des Monts but had to stop work owing to lateness of season.

November 29th to December 3rd.—Towed British steamer *Melmore Head* from Quebec to Bic.

December 5th to 7th.—Towed off British steamer *Bassa* which ran aground in St. Lawrence river off Vickers wharf.



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December 9th.—Towed American steamer *Lake Elmsmere* from Three Rivers to Quebec; this steamer lost her propeller in the ice.

The ss. *Lord Strathcona*, schooner *G.T.D.*, properly manned, and all salvage gear, in good order, have been kept in commission during the season of navigation to proceed to any accidents or mishaps to ships at very short notice.

REPORT OF THE PACIFIC SALVAGE COMPANY, LIMITED.

1919.

August 6th to 9th.—Salving *Princess Ena*, struck rock at Seymour narrows.

August 20th to 30th.—Salving ss. *Shinbu Maru*, struck at Bentinck island near Race rocks.

1920.

March 30 to 31.—*Prince John* struck at Dead Tree point Queen Charlotte islands.

RETURNS OF SHIPPING MASTERS FOR THE YEAR ENDING DECEMBER 31, 1919.

NOTE.—The Collector of Customs acts as shipping master where no shipping master is appointed.

QUEBEC.

Name of Port.	Name of County.	Name of Shipping Master.	Seamen Shipped	Seamen Discharged	Amount.
Chandler.....	Gaspé.....				
Escoumains.....	Saguenay.....				
Gaspé.....	Gaspé.....				
Grand Pabos.....	Gaspé.....				
Montreal.....	Hochelaga.....	I. O. Grey.....	3,822	2,669	2,801 80
Magdalen islands.....	Gaspé.....	C. F. Painchaud.....	Nil.	Nil.	Nil.
Paspébiac.....	Bonaventure.....	E. W. LeGallais.....	Nil.	4	1 20
Perce.....	Gaspé.....	Phil. LaBoutellier.....	Nil.	Nil.	Nil.
Quebec.....	Quebec.....	T. Beland.....	456	283	304 80
Rimouski.....	Rimouski.....				
St. Johns.....	St. Johns.....				
Three Rivers.....	St. Maurice.....	W. D. Fisher.....	1	1	0 80
			4,279	2,957	3,108 60

NEW BRUNSWICK.

Albert.....	Albert.....	H. W. Crocker.....	Nil.	2	0 60
Alma.....	Albert.....				
Baie Verte.....	Westmoreland.....				
Bathurst.....	Gloucester.....	C. J. Melanson.....	Nil.	5	1 50
Chatham.....	Northumberland.....	R. J. Walls.....	6	8	5 40
Dalhousie.....	Restigouche.....				
Dorchester.....	Westmoreland.....				
Fredericton.....	Westmoreland.....				
Grand Harbour.....	Charlotte.....				
Harvey.....	Albert.....				
Hillsborough.....	Albert.....	H. J. Steeves.....	10	6	6 80
Lepreau.....	Charlotte.....	J. E. Haggerty.....	Nil.	Nil.	Nil.
Musquash.....	St. John.....				
New Brandon.....	Gloucester.....				
Newcastle.....	Northumberland.....				
Quaco.....	St. John.....				
Riverside.....	Albert.....				
Rockport.....	Westmoreland.....				
Sackville.....	Westmoreland.....	F. W. George.....	Nil.	Nil.	Nil.
St. Andrews.....	Charlotte.....	Thos. R. Wren.....	Nil.	2	0 50
St. John.....	St. John.....	W. H. Purdy.....	847	358	530 90
Shediac.....	Westmoreland.....				
Shippigan.....	Gloucester.....				
*St. Stephen.....	Charlotte.....	Andrew McWha.....	Nil.	Nil.	14 00
St. Martins or Quaco.....	St. John.....	R. Allan Love.....	21	14	14 70
St. George.....	Charlotte.....				
			884	395	574 50

\* From 21 Lighters and sardine boats.



## SESSIONAL PAPER No. 21

## RETURNS OF SHIPPING MASTERS—Continued.

## NOVA SCOTIA.

Name of Port.	Name of County.	Name of Shipping Master.	Seamen Shipped.	Seamen discharged.	Amount.
Advocate Harbour.....	Cumberland.....	E. C. Moore.....	Nil.	Nil.	Nil.
Amherst.....	Cumberland.....				
Annapolis Royal.....	Annapolis.....				
Antigonish.....	Antigonish.....				
Apple River.....	Cumberland.....				
Arichat.....	Richmond.....	Chas. V. Herbin...	4	Nil.	2 00
Baddeck.....	Victoria.....				
Barrington.....	Shelburne.....				
Barton.....	Digby.....	F. W. Hutchinson..	7	Nil.	3 50
Bayfield.....	Antigonish.....				
Belliveau Cove.....	Digby.....	E. E. Theriault....	6	Nil.	3 00
Bear River.....	Digby.....	J. L. Warren.....	17	7	10 60
Bridgewater.....	Lunenburg.....				
Canning.....	Kings.....	J. W. Miller.....	Nil.	Nil.	Nil.
Canso.....	Guysborough.....	P. C. Cullen.....	48	30	33 00
Church Point.....	Digby.....				
Clark Harbour.....	Shelburne.....				
Clementsport.....	Annapolis.....	M. C. Jones.....	12	7	8 10
Cheverie.....	Hants.....	Nelson Brady.....	6	4	4 20
Descousse.....	Richmond.....				
Digby.....	Digby.....	A. M. Gidney.....	17	19	14 20
Glace Bay.....	Cape Breton.....				
Great Village.....	Colchester.....				
Guysborough.....	Guysborough.....	H. M. Scott.....	17	9	11 20
Hawkesbury.....	Inverness.....				
Halifax.....	Halifax.....	H. S. Drake.....	3,844	2,939	2,802 70
Hastings.....	Inverness.....				
Hantsport.....	Hants.....	J. W. Lawrence.....	30	28	23 40
Havre Bouche.....	Antigonish.....				
Isaac Harbour.....	Guysborough.....				
Jordan Bay.....	Shelburne.....	E. Lyle Martin.....	Nil.	Nil.	Nil.
Lahave.....	Lunenburg.....	E. M. Reinhardt....	234	192	174 60
Liscomb.....	Guysborough.....	Wm. Hemlow.....	4	2	2 60
Liverpool.....	Queens.....	W. A. Smith.....	65	13	36 40
Lockeport.....	Shelburne.....	J. R. Ruggles.....	5	3	3 40
Louisburg.....	Cape Breton.....	A. M. Townsend....	129	127	102 60
Londonderry.....	Colchester.....				
**Lunenburg.....	Lunenburg.....	William Shupe.....	459	398	473 90
†Mahone Bay.....	Lunenburg.....	T. F. Mader (acting)	41	26	35 80
Mainadieu.....	Cape Breton.....	A. McDougall.....	Nil.	Nil.	Nil.
Maitland.....	Hants.....				
Margaretsville.....	Annapolis.....	J. L. Cleveland....	7	Nil.	3 50
Margaree.....	Inverness.....				
Merigomish.....	Pictou.....				
Meteghan.....	Digby.....	L. T. Melanson.....	14	7	9 10
New Campbellton.....	Victoria.....				
North East Harbour.....	Shelburne.....	G. B. Swaine.....	Nil.	Nil.	Nil.
North Sydney.....	Cape Breton.....	M. J. Ross.....	559	482	424 10
Parrsboro.....	Cumberland.....	E. Woodworth.....	165	120	118 50
Pictou.....	Pictou.....	W. E. Jones.....	94	81	71 30
Port Greville.....	Cumberland.....	F. R. Canning.....	10	18	10 40
Port Hawkesbury.....	Inverness.....				
Port Hastings.....	Inverness.....	Geo. L. McLean....	Nil.	Nil.	Nil.
Port Hood.....	Inverness.....				
Port Lorne.....	Inverness.....				
Port Mulgrave.....	Guysborough.....	M. J. Keating.....	56	66	47 80
Port Latour.....	Shelburne.....	Benj. R. Smith.....	Nil.	Nil.	Nil.
Port Medway.....	Queens.....				
Port Morien.....	Cape Breton.....				
Port Williams.....	Kings.....				
Port Wade.....	Annapolis.....				
Pubnico.....	Yarmouth.....	J. L. Belliveau....	6	Nil.	3 00
Pugwash.....	Cumberland.....	R. H. Pope (acting)	8	Nil.	4 00
River Hebert.....	Cumberland.....				
Riversport.....	Lunenburg.....				
St. Anns.....	Victoria.....	D. McAulay.....	Nil.	Nil.	Nil.
St. Peters.....	Richmond.....				
Salmon river.....	Digby.....	E. P. Deveau.....	2	1	1 30
Sheet Harbour.....	Halifax.....				
Shelburne.....	Shelburne.....	A. C. Bruce.....	48	4	25 20
Sherbrooke.....	Guysborough.....				
Spencers Island.....	Cumberland.....	Geo. D. Spicer.....	Nil.	Nil.	Nil.
Sydney (Whitney pier).....	Cape Breton.....				
Thione Cove.....	Annapolis.....				
Truro.....	Colchester.....				
Tatamagouche.....	Colchester.....	J. Ramsay.....	Nil.	Nil.	Nil.
Wallace.....	Cumberland.....	A. D. Macfarlane...	Nil.	Nil.	Nil.

\*\* Three fishing crews.

† Fifty fishing crews at \$2.50—\$125.00



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RETURNS OF SHIPPING MASTERS—*Concluded.*

NOVA SCOTIA—*Concluded.*

Name of Port..	Name of County.	Name of Shipping Master.	Seamen Shipped.	Seamen discharged.	Amount.
Walton.....	Hants.....				
West Arichat.....	Richmond.....				
Weymouth.....	Digby.....	A. H. Brooks.....	51	22	32 10
Windsor.....	Hants.....				
Wolfville.....	Kings.....				
Yarmouth.....	Yarmouth.....	S. E Messenger.....	166	81	107 30
Whitney pier.....	Cape Breton.....	V. Mullins (acting).. 6,356	225 4,932	246 4,789 10	186 30

PRINCE EDWARD ISLAND.

Alberton.....	Prince.....				
Charlottetown.....	Queens.....	F. Beers.....	55	45	41 00
Crapaud.....	Queens.....	Neil Waddell.....	2	Nil.	0 60
Georgetown.....	Kings.....	T. E. Morrissey.....	7	5	5 00
Malpeque.....	Prince.....	R. J. Crafer.....	Nil.	Nil.	Nil.
Murray Harbour.....	Kings.....	H. A. Bell.....	Nil.	Nil.	Nil.
Montague.....	Kings.....				
Pinette.....	Queen's.....				
Port Hill.....	Prince.....				
St. Peter's.....	Kings.....				
Souris.....	Kings.....				
Summerside.....	Prince.....				
Tignish.....	Prince.....				
			64	50	46 60

BRITISH COLUMBIA.

Aboucet.....	Vancouver.....				
Clayoquot.....	Comox-Atlin.....				
Hesquiat.....	Comox-Atlin.....	Chas. Moser.....	Nil.	Nil.	Nil.
Kyuquot.....	Comox-Atlin.....	A. Ellis.....	Nil.	Nil.	Nil.
Masset.....	Comox-Atlin.....	C. Harrison.....	Nil.	Nil.	Nil.
New Westminster.....	New Westminster.....				
Prince Rupert.....	Skeena.....	E. McCoskrie.....	359	353	235 70
Tofino.....	Comox-Atlin.....				
Vancouver.....	New Westminster.....	J. B. Campbell.....	4,074	3,404	3,053 20
Victoria.....	Victoria.....	Geo. Kirkendale.....	2,192	1,553	1,561 90
			6,625	5,315	4,905 80

RECAPITULATION.

	Seamen Shipped.	Seamen discharged.	Amount.
Quebec.....	4,279	2,957	\$ 3,108 60
New Brunswick.....	884	395	574 50
Nova Scotia.....	6,356	4,932	4,789 10
Prince Edward Island.....	64	50	46 60
British Columbia.....	6,625	5,315	4,905 80
Total.....	18,208	13,649	13,424 60



## SESSIONAL PAPER No. 21

## LIVE-STOCK SHIPMENTS.

List of live-stock shipped from May, 1919, to November, 1919, to ports in  
Britain France and Belgium.

## MONTREAL.

Months.	Sheep.	Horses.	Cattle.
1919.			
May.....		4	229
June.....			575
July.....		1	230
August.....		52	424
September.....			230
October.....		52	208
November.....			397
		109	2,293

## EXPENDITURE AND REVENUE.

The parliamentary appropriation for the fiscal year 1919-20 was \$45,289,-781.27, the expenditure \$37,836.743.70, leaving an unexpended balance of \$7,453,037.57. The net revenue was \$303,001.87.

## CORRESPONDENCE.

The number of letters received during the fiscal year 1919-20 was 74,995, as against 66,601 in 1918, an increase of 8,394.

The number of letters sent out was 42,500, as against 39,116 in 1918, an increase of 3,384.

This increase is chiefly due to correspondence relating to the new Canadian shipbuilding programme, post-war reconstruction work, and the new system of making appointments to the outside service through the Civil Service Commission.

## SEASON OF NAVIGATION.

At the port of Montreal channel was reported clear on April 14, six days earlier than in 1918. The Government ice-breaker *Lady Grey* arrived from Quebec on April 16, and the first ocean-going ship, the *War Red Cap*, on April 23.

Navigation closed on December 12, two days earlier than in 1918. The last sea-going vessel to leave the port was the *Canadian Planter*.

## NEW LEGISLATION.

During the parliamentary session of 1919-20, the following new legislation affecting the department was enacted.

Canada Shipping Act (Certificates of service), Bill No. 21.

Canada Shipping Act (Steamboat Inspection), Bill No. 49.

Canada Shipping Act (Pilotage), Bill No. 94.

Canada Shipping Act (Sick and distressed mariners), Bill No. 127.

Shipbuilding, Bill No. 199.

## STEAMBOAT INSPECTION.

The report of the Chairman of the Board of Steamboat Inspection is published as a supplement to the annual report.

A. JOHNSTON,

*Deputy Minister of Marine and Fisheries.*



